

# The Commercial Car Journal

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## WHAT IS THE MATTER WITH THE MOTOR TRUCK INDUSTRY?

By DAVID THOMAS, Formerly General Manager of the M. T. M. A.

**T**O comply with a request that I write a brief article on the Motor Truck Industry, I am offering the following as an attempt to give an answer to the question which has been asked many times in the last six months.

What I have in mind throughout this article is the Industry as a whole and not this or that truck company, or any individual, or group of individuals. As far as this article is concerned the Industry is as impersonal as the Oak Tree would be if I were writing of its growth and development.

I write this article with great faith in the Industry—a faith begotten of the realization of the intrinsic worth of the Motor Truck to our national economic and social life and

of a high appreciation of the personnel of the Industry with which I have had the privilege to become acquainted.

I am fully aware that a criticism is always most easy to make; and if this article may be considered such, it is offered with the sincere hope that it may prove constructive and helpful.

No criticism can be made of the Motor Truck Industry that could not have been made in kind of any one of the older industries during the period of its early development. Every real man was once a real boy, and even so the oldest of our industries was once young.

Now, with this introduction, I feel at liberty to proceed with frankness and possibly with homely illustrations to convey my thoughts to you.

**W**HAT is the matter with the Motor Truck Industry?"

As I see it there is nothing at all the matter with it. It is perfectly healthy and robust. Of course, it is young. My neighbor has a St. Bernard pup a few months old and he will assure you that because his pup is somewhat awkward of proportions and at times apparently fails to adapt himself most discreetly for his own good as well as for the good of others, there is not the slightest reason for concluding or presuming that there is anything wrong with that puppy. He is young.

There is nothing wrong with the motor truck industry, when viewed in the light of the histories of all our other industries. It is young and of course, we could not wisely expect to find it with mature proportions and perfected adjustments at this early stage in its development, especially when we remember that nature prolongs the infancy of her most stupendous and magnificent creations.

We shall have to admit, however, that the Industry is slightly undernourished at the present time. This is due especially to the fact that it has just been weaned. That, upon which it fed and by which its huge physique was so quickly developed, has departed. While it remained it was surely a lavish, though possibly an unwise, nurse to the motor truck industry.

When the World War was ended, an end was also put to its unsatisfiable direct

demand, as well as its huge indirect demand for motor trucks. Thus was the Industry suddenly weaned. With a physique of unbelievable proportions and requiring much nourishment—and its nurse gone! The industry had had little experience in blazing trails for itself and in developing new fields for the nourishment which its organism required.

So as I see it the motor truck industry is in its infancy. Its new diet will require much persistent and wise effort to secure and much patience to assimilate. This effort, however, will bring to it experience and adaptability. At first the effort may be followed by lameness and a feeling of still being underfed, which will be relieved only by more effort—for business, such as the motor truck industry has known, is not coming back—unless we have another world upheaval.

### "Soft Times" Are Gone

The industry is undernourished just now not because of hard times, but because very soft times have gone—and because like our puppy it has been very reluctant to bid those "soft times" goodbye.

We must admit that "soft times" very well characterizes the period of the industry's great growth. Almost at the beginning of its existence the Great War broke out in Europe, creating an almost insatiable demand for the product of the industry. Then followed our entry into the conflict which intensified the demand for motor trucks.

In addition to this direct demand of the war, there was the indirect domestic demand due to the general speeding up of production. A goodly proportion of this demand was as unreasoned as the demand of the same period for silk shirts.

There was indeed a demand for trucks—and a truck was a truck. Neither the buyer nor the seller gave exacting consideration to the adaptability of the particular truck to the work it was to do. Consequently, in many instances the wrong truck was sold to the right man and vice versa.

A motor truck sale was too often the delivery of a truck upon a small down payment which was to be followed by monthly installments. Salesmanship did not generally involve even the fundamentals of the Science of Transportation Engineering as it is beginning to be, and must be, applied to the motor truck.

Price was not a very important consideration in either the buying or the selling, even as in the buying and the selling of other commodities during this period. Those who previously had had little money now found that their day's labor produced much. Some of this was traded for motor trucks. The ambition evidenced was laudable but the sale was not always good business for the seller of motor trucks. However, the resultant experiences have taught the industry that all sales effort should be directed mainly toward selling the truck to the "boss" rather than to his "driver."

Throughout this period the manufac-

turer's big problem was that of production, and his sales manager was his uncrowned king. The members of the industry possessed an ambition for worldwide distribution. Factory capacity was hopefully increased. The organization was proudly enlarged.

But possibly the industry's greatest mistake was its apparent failure to appreciate that the period through which it was passing was abnormal and temporary. When the end of the period came the industry was as one awaking out of a pleasant dream of dwelling amid roses only to find a howling North-Easter driving snow over his covers. Unfortunately the industry did not quickly banish the dream—and too long we heard it stammering "when business comes back."

During the interval while the industry was attaining the consciousness that business, such as it had known, was not coming back, we find that its pet peeve was the banker. I think that now the industry is beginning to see the humor of its relationship with the banker and he is about to be the recipient of pæans of praise and gratitude for having made it impossible for it to build a skyscraping office building in the Sahara Desert.

We hear much these days about normal and abnormal business and we are all praying for "normalcy." For no department of business can it be determined accurately what the new normal toward which it is approaching shall be. Of the motor truck business it may be said that either fortunately or otherwise, it has never known a normal business and therefore its yard stick is yet to be made.

#### The Truck is Established

We do know that transportation is fundamental to the continuity and progress of our national economic and social life. As the railway and waterway opened up broad areas to production and habitation and reclaimed sleeping wealth, even so vaster empires of more colossal wealth are to be uncovered and developed by some means of transportation that will cross and recross these present great arteries of trade. And we believe that the motor truck is that means of transportation.

The "soft times," the "good old days" of the industry have gone. Now the industry is readjusting itself. This readjustment involves among other things, a patient, careful, and sympathetic consid-

eration of the situation, made up, as it is, of both the good and bad effects of the "good old days."

Once in a while I wonder if the industry gave us a bigger dose of motor trucks than we were prepared for. How else account for the fantastic mosaic of legislation ostensibly designed to protect the highway unless we graciously presume indigestion—and that in more than one sense. It is of course true that our highways were not prepared for the large trucks. It is equally true that heavy rails and a capable road bed preceded the heavy rolling equipment of the railroads.

#### Highway Success Means Industry Success

I have mentioned this not as an apology for inferior highways, but to suggest that the industry patiently and sympathetically consider the actual state of highway development and prudently adjust itself to



Disillusionment of Interpreting "Soft Times" as Normalcy

it, always remaining its leader and its unfailing source of inspiration, and near enough to that which is being led that the leadership and the inspiration may not be dissipated by any misunderstanding. Such consideration for the highway will help rather than retard the growth of the industry.

The taxes which the industry has been called upon to bear would indicate that its product has not been appreciated at its real and intrinsic worth, that is as a means of production and transportation—pure and simple. Other adverse legislation would indicate the same thing. All of which suggest the industry's great need of true educational propaganda.

No small part of this need for educational propaganda will be met, and in a reasonable and practical way, when motor truck salesmanship roots itself in the fundamentals of the Science of Transportation Engineering and when the moral courage of the industry will avoid the "ill-advised" sale as one would avoid stealing.

The price-reducing and the price-cutting which followed hard on the heels of the "good old days" was to have been expected though more method in its sanity would have been more complimentary to the industry as well as more profitable to it and to its customers. It marked, among other things, the passing of a day when the seller controlled the market and the dawn of a day for the industry when production cost as well as the cost of selling had to be more carefully scrutinized. The youth of the industry, when it realized this new situation, accounts for the many unhappy turns in the course which the price-reducing and price-cutting ran. That there was a lack of the calmness and poise with which some of the older industries faced similar situations may not be denied—but let that industry which has never likewise erred begin casting the first stone.

I have heretofore noted the ambition for national and international distribution which seemingly infected nearly all manufacturers who allied themselves with the industry. In a well known poem we read, "Ambition is a thing that boys should shun." Even as, I presume, our lady, of other days, begowned and bejeweled for the opera, would have shunned the most beautiful carriage if drawn by a team of unbridled bronchos. Bridled ambition gives due recognition the limitation of facts

and is directed by their admonitions.

The ambition which characterized the industry seems to have overlooked the limitations of the possibilities of the means of properly and efficiently servicing the truck. The seriousness of this oversight is more and more clearly recognized as the absolute necessity of efficient service is revealing itself as being the corner stone of the industry's successful development.

#### Tendencies of Service Methods

The far-flung distribution lines of the majority of the manufacturers made apparently impossible the correction of this oversight with the necessary rapidity. The seriousness of the situation thus created seemingly constrained the unit and part manufacturer to disregard precedents and to come to the rescue by establishing his own service stations.

May it not be that the establishing of service stations by the unit and part manufacturer is indicative of an interest-



ing and important tendency in the development of the industry. May it not be that the number of the manufacturers of motor trucks is going to increase rather than decrease, as has been true of the automobile industry, which is of course an unreliable guide to the student of the motor truck industry.

#### Fear Not Lack of Demand

Those fields that so readily welcomed the motor truck in the "good old days" will always make a replacement demand upon the industry. This demand will be specific and well considered and will help the fit to survive. However, the real future of the industry lies in new and, save to the imagination, undiscovered fields. The industry's conquest of those fields will require persevering and scientific effort and it will undoubtedly be comparatively slow and gradual.

"Adaptability" is going to be the outstanding characteristic of the industry.

Every field which is now, consciously or unconsciously, awaiting the industry's advent into it, has its own peculiar requirements. As the industry adapts itself to meet those requirements, will it conquer those fields. An illustration of what I have in mind is the method of the industry as it prepares for the development of the bus field. And this preparation is prophetic of the preparation it shall make for the development of other fields.

In the bus field the industry is making a thorough and scientific survey of the particular locality to learn its real and actual requirements. With this survey completed the industry impartially studies the adaptability of the design of its present product to the requirements of the new field.

The result of this study may be that it will conclude that "the average truck chassis is unsuitable for passenger transport because the weight is excessive, particularly the unsprung weight, the center

of gravity is too high, the gear ratios are unsuitable, the springs are too rigid, the frames and the springs and the axle tracks are too narrow, the turning radius too wide, the steering too stiff, etc."

Whether these changes and similar changes, or even more radical changes, may be found necessary to meet the requirements of the bus field, the industry is giving proof of its virility by setting out resolutely to make its product exactly suitable.

#### "Adaptability" Will Preserve Industry

After this fashion will the motor truck industry go into one field after another. Here we have, indeed, an instrument that would have delighted the empire-builders, the Hills and the Cecil Rhodes. And we may rest assured that the Alexander, who applies his genius to the motor truck industry, will die long before he shall need to weep because he has no more worlds to conquer.

## Some Pointers on Servicing Speed Trucks

How the Dealer Can Cash in on Battery Service, Tire Service, and Even on a Washing Service

*Are You Prepared to Get Some of This Business?*

By C. P. SHATTUCK

**S**HOULD the service station of the dealer merchandising speed trucks, up to and including  $1\frac{1}{2}$  tons capacity, devise and offer a service different from that given the larger capacity chassis? Does the truck operating at high speeds require more frequent inspection and attention?

Viewed from a mechanical or a design standpoint, the answer is negative, for have not the engineers taken into consideration the factor of speed and its effect upon the chassis components? If we consider the brakes, for example, has not the need of a greater area of frictional surface necessary to safely control the vehicle at high speeds been provided for by the engineers? The same may be said of other components subject to such stresses as may be imposed by the high speed truck.

A few statistics, taken from the specification tables of the October issue of the COMMERCIAL CAR JOURNAL is the basis of contention that there is need of a somewhat different type of service needed for the speed truck than its big brother.

Of the 1500-lb. capacity models it will be found that 55 per cent are equipped with battery ignition, 23 per cent of the ton jobs, 30 of the  $1\frac{1}{4}$ -ton and 10 of the  $1\frac{1}{2}$ -ton also have battery ignition.

Starters will be found on 53 per cent of the 1500-lb., 50 on the ton, 40 on the  $1\frac{1}{4}$ -ton and 30 on the  $1\frac{1}{2}$ -ton.

Pneumatics are used on two or all wheels of 75 per cent of the 1500-lb. chassis, 58 on the 1-ton, 50 on the  $1\frac{1}{4}$ -ton and 23 on the  $1\frac{1}{2}$ -ton. These percentages

do not consider optional equipment, nor that listed as "own" by the manufacturer.

Battery ignition and starters means a battery. Thus the figures quoted can be accepted to indicate that the owner must depend upon a storage battery for his source of current supply for ignition and starting. Without the right kind of battery service the battery equipped speed truck cannot operate efficiently, and this is particularly true when the factors having to do with batteries in cold weather, such as frequent use of the battery in starting when engines do not readily respond, thanks to the present grade of fuel, and the more frequent use of the lights in the short days of the winter are considered.

#### Dealer Must Render Service

It may be contended that inasmuch as the battery comes under the head of equipment, that the battery makers have service stations to care for their product, and that the dealer is not concerned. The writer holds that in the case of the motor truck the dealer should not pass the buck to the battery station, but service the battery at his service station. Whenever trouble is experienced with a battery, due to neglect or damage, the general practice is for the dealer to pass the buck to the battery service station with the remark, "The guarantee does not include equipment. Take the battery to the service station." This compels the truck owner to make one extra call, and how much operating time is lost by this extra effort?

What kind of battery service should the dealer supply?

It should be a service that will keep the truck on the road and battery costs at the lowest possible point. The service should not compel the truck owner to waste time explaining, listening to explanations of the whys or wherefores, arguing, etc., which frequently precedes or follows battery troubles and service. What the dealer should do is to supply a rental battery, if needed, and if the neglected or damaged battery can be repaired at a reasonable cost, see that the repairs are promptly made. This suggestion may meet with objections upon the part of the battery makers who have established service stations and who are endeavoring to render satisfactory service to users of their product. The writer is not suggesting that the dealer compete with the battery service station, but that both co-operate so that the truck user's time and expense will be conserved.

The dealer can render good battery service in two ways. First, he can anticipate battery trouble to a great extent by an educational and inspection campaign. It is being done. One dealer in New England who handles a well known line of speed trucks anticipates battery trouble to a practical extent by conducting a battery department, the expert of which inspects the battery of every truck coming into the service station. Not only are readings taken, water added, terminals cleaned and contacts examined, but the generator is also inspected to see if it is charging properly. If a cell is below par

the owner is notified. A report is given him, after inspection, also an estimated cost of repairs. If the battery is "shot to pieces," or the cost of repairs is out of proportion to the service it will render when repaired, then the owner is sold a new battery and is sold by the service station.

The dealer referred to believes that he should not pass any "equipment bucks" to his owners for as he says, "I am selling the truck, its service and satisfaction. If there are any 'adjustments' to be made, my departments will make them and to the satisfaction of the customer. When you send your customers outside you not only lose contact with them, but expose them to experiences which are very likely to reflect upon the truck and create sales resistance. My experience is that the owner experiencing trouble with equipment does not place the blame where it belongs, on the equipment, but condemns the truck as a whole. And is it not logical, human nature, to condemn any construction if a part is not satisfactory?" This dealer supplies batteries while repairs are being made, and, similarly, a generator or a starter. His one, big idea is to keep the truck operating and the user satisfied. That is why he is cashing in on this policy with SALES NOW.

There is another thought in connection with the truck battery service and this is that the owner of the truck looks at all operating costs, and a battery is but one of many items he considers. Therefore the dealer should keep battery costs at the lowest possible point, which he can do if his inspection system or plan will permit of inspection along the same lines as the New England dealer.

If the dealer does not desire to establish an electrical department, which he should do for the simple reason that he can give satisfactory service on electrical equipment, and make a profit on the sale of batteries, he can train a man to inspect, test, etc., batteries and give first aid service. If he does not care to stock batteries, which he should because of the profits therein, he can arrange to have at least a sufficient number on hand to care for emergencies. These rental, emergency or service batteries can be kept in condition by the installation of charging equipment of which there is a variety on the market and not expensive. The dealer can render battery service for the speed truck, or any other battery equipped truck for that matter, by an educational campaign, verbal and by mail, by teaching his customers that neglected batteries mean repairs, expense and lost time. The data for such letters or campaign can be obtained from any battery maker or service station.

One dealer to whom the writer made the above suggestions contended that the battery maker was educating users to rely upon their service or authorized service stations for battery service, and that it was the practice of the dealer to further this plan. To which the writer replied it was a passenger car practice, and that which applied in service with passenger cars was not logical because trucks are sold and serviced on the work they will do, motor highway transportation, and costs are scrutinized more carefully. The

writer also pointed out that many dealers in the passenger car industry maintained a battery and electrical department with profit and sold batteries, at a profit. And that those dealers who handled both passenger cars and trucks found a battery and electrical department necessary.

Relative to battery service with the speed truck the dealer can reduce ultimate costs are scrutinized more carefully. The and seeing that the battery gets attention. A similar plan can be practiced with results by servicing the electrical equipment, whether it be battery, magneto, generator or starter. Ignition, if properly cared for, reduces operating costs, the variable charges, and if more dealers would do as Russell P. Tabor, Inc., whose methods were described in the September issue of the COMMERCIAL CAR JOURNAL, there would be less ignition trouble. Tabor cleans and adjusts the battery ignition unit of every truck coming into the service station and the work of touching up the points costs him about 15 cents. Starting troubles are reduced to a minimum by the service and, as is obvious, there is less drain on the battery. Similarly the service station can give the gaps of the spark plugs the once over and sell plugs when needed.

#### Tire Service on Speed Trucks

Coming to the second phase of the speed truck service the statistics quoted show that in the aggregate over 50 per cent of the models are equipped with pneumatics. Who is going to render service for the tires and who will sell the replacements? Will it be the gyp tire dealer, whose methods are price and no service, or will it be the truck dealer, or legitimate tire dealer who sells at list and employs part of the profits to render service?

The writer holds no brief for the truck dealer who says he cannot compete with the cut price tire dealer. The experienced dealer does not have to compete if he gives service. And what is service? It is simply selling the speed truck owner with the right capacity or size of tire for the load and work the truck does plus a reliable, dependable service, such as was described on page 21 of the October issue of the COMMERCIAL CAR JOURNAL. It is essential for the dealer in pneumatic tired trucks to render road and shop service, as it is to carry and install parts or succor a crippled truck on the highways. A stock of tires and tubes, extra rims, free air, tire and tube repair department and a 24 hour service. This does not mean that a tire man must be on duty all night, but that the night or emergency man can be taught how to service tires. Tire service should include periodical inspections of tires, education of the driver as to care and inflation of tires, and data obtained from this service can be cashed in on the tire sales department.

#### How About a Washing Service?

Inasmuch as a large number of trades or industries purchase high grade bodies and have these and the chassis painted in keeping, it affords the dealer an opportunity to merchandise a washing service. Just why the average motor truck is covered with dirt and grime, paint flaked off and

chassis covered with oil and grease always has been a mystery to the writer. And why the dealer does not endeavor to educate the purchaser of a new truck as to the advantages of keeping it clean or spick and span is another thing. Some dealers carefully wash the chassis before the sale, probably to remove the evidences of travel or for a psychological effect, maybe both. As yet I have not found a truck dealer who has made an attempt to sell his trade on the advantages of keeping the truck nicely washed or painted. Nor have I found a dealer who is merchandising a washing service. The answer may be that it is done in the garage where the truck is stored.

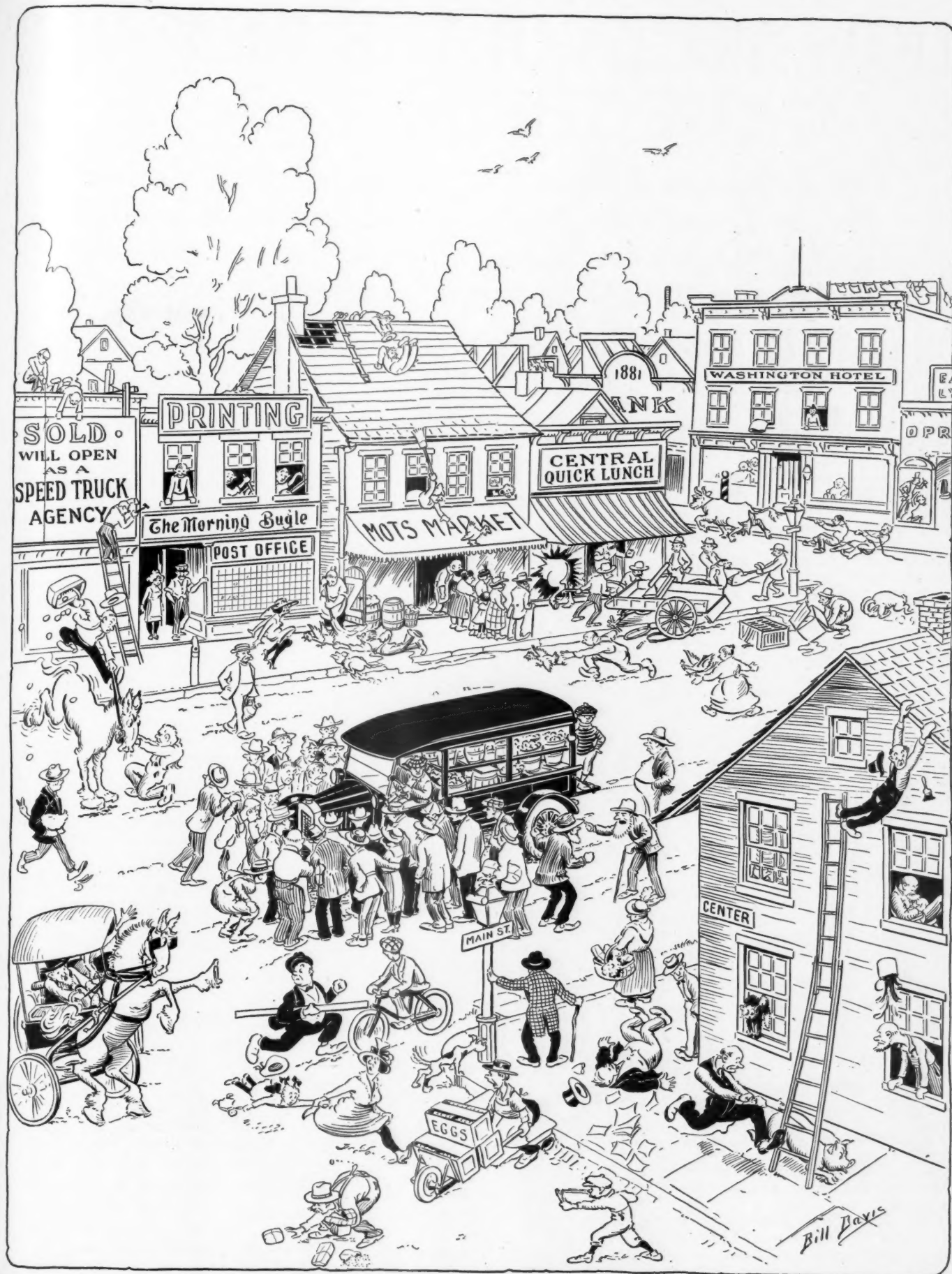
Granting this to be true—what is done with the trucks garaged where there are no washing facilities? The writer believes the speed truck dealer could take a leaf from the book of experience of the passenger car dealer and establish a washing service. It would be practical to sell such service at a reasonable rate and to give one or two free launderings with each new truck and body sold, to sell the owner on the advantages of being represented in his business by a truck that reflects credit upon his house. The development of the plan, which would mean night washing, would be good advertising for the dealer, for a nicely painted and clean job attracts attention on the streets—it's a high grade silent salesman. Bringing the truck in for a bath would also be the means of making contact with those owners who do not respond to the inspection system. And inspection could be made. The plan would also present an opportunity to sell the driver and the owner the work needed. The cost of washing apparatus is small. The department could be made to pay if properly conducted and the service merchandised and advertised. Effort need not be confined to your trucks alone, Mr. Dealer, for you could sell the service to your competitor's owners. And if you made contact with them, why, you might secure a prospect.

The dealer of speed trucks can also render a service different from the dealer in big trucks by servicing the lighting equipment. The laws of the States require non-glare lenses. These are frequently broken and afford a replacement business. Bulbs and fuses burn out. Drivers tinker with the focus of the bulbs. So a service and sales plan is well worth considering because there is profit plus the satisfied customer.

There's only one way to make the above suggestions worth anything and that is to follow them out. They can only be cashed-in on by putting them into use. The amount of profit derived will depend entirely upon the energy the dealer displays and the amount of selling effort he puts behind the project. He must have the sales manager and his salesmen sell the customer, and he must advertise this service by direct mail, newspaper and phone calls.

The crux of any service plan is to keep the truck operating at maximum efficiency with a minimum of operating and maintenance costs. And to keep the owner satisfied. It can be done. It is being done. Are you doing it?





When the "Speed Truck" Arrived in Centerville

# HOW TO TAKE THE KICK OUT OF THE KICKER

**An Inspection System That Inspects, Good Service, Service Records for Evidence, and Service Salesmanship Not Only Eliminates Complaints, But Reduces Cost to the Owner and Breaks Down Future Sales Resistance**

*This Story Explains How One Dealer Satisfactorily Treats His Kickers*

By C. S. PERRIE

**E**VERY service manager, his assistant, and the dealer and his sales force, knows the kicker. He complains that his truck "went to pot" because the service station did not attend to certain little jobs which developed into big expense. But his one big kick is "Outrageous repair bills, etc." We all know the type and he is not in the minority by any means.

One of the reasons why truck dealers developed an inspection system, why manufacturers encouraged the plan, was that it was thought that by having the truck owner, or his driver, bring the car to the service station for inspection and lubrication, that large repair bills would be eliminated through frequent adjustments and attention. But the average dealer knows—that unless the inspection system is a real inspection system, where the truck is really inspected and work recommended done—that the owner who will not co-operate is the one who kicks longest and loudest when presented with the large repair bill due to neglect.

## Cannot Fix Responsibility

One of the weak points of the inspection system, as generally practiced, is getting the message over to the right man. The dealer compiles and mails, also telephones, messages to the owner which should "bring home the bacon." But, does the dealer know that his message registers, that it reaches the right man? Let us assume that a sale of a truck or trucks is made to Brown, Jones & Brown,



"Pin the Rose" on the "Responsible Man"

a big concern, and it is their first experience with motor highway transportation. After the decision of the firm to use trucks, the details involving the actual sales transaction fell into the hands of a subordinate who gave the order. Messrs. Brown, Jones & Brown, having approved

of the purchase, forgot the deal, for they have other business matters demanding their attention, and transportation is but one of many details.



Taking the Kick Out of the Kicker

Now when the sale is made, the dealer's system, inspection included, begins to function. The service station records show that the drivers for Brown, Jones & Brown came in during the first month, but thereafter they failed to respond to treatment. Follow the usual letters addressed to Brown, Jones & Brown, and it will be found that these are consigned to the waste basket by these worthy men who are pestered to death with circulars, etc. Or, let us assume that they read the letter and shoot it along to some subordinate who in turn forgets it and loses the letters. Next comes the telephone call. Again Mr. Brown, or Jones, is annoyed. Yes, he is interested in his truck costs and is surprised that the matter was not attended to, but he will look into it. Mr. Dealer hangs up and thinks his little talk has sunk in. But Mr. Brown has some important matters demanding his attention and that of his trucks slips his mind. Or, on the other hand, he may be annoyed by the letters or calls if he has not been properly sold on what the inspection service means to him in dollars and cents.

## Enter the Accountant

The next act is the pouncing upon the big repair bills for the trucks by the expert accountant. This human calculating machine may not like trucks. Some don't. The average accountant will find more reasons to charge items to trucks than there are fleas on a dog. Mr. Ac-

countant calls Mr. Brown's attention to the bills, to the cost of haulage, and it is not unreasonable to assume that the accountant may have some cost figures based on transportation methods that the trucks have superseded. Of course the accountant won't have any figures crediting the trucks with increasing the business, filling emergency orders, or performing work that the horse or other methods could not have done due to limitations. The accountant won't because he says he cannot credit theories. He must have figures.

Mr. Brown is surprised. He or someone else will write a letter and in polite English call the dealer's attention to the fact that the bill is robbery. Mr. Dealer will call the service manager in and items, parts, labor are checked up. Vouchers will be examined and a lot of other costly labor involved, all of which increases the overhead and cuts down profits. Then ensues correspondence, telephone skirmishes and, finally, the diplomat of the dealer's organization will call on Mr. Brown and "straighten out" the account. It is not unreasonable to assume that an "adjustment" will be made, a certain sum deducted from the bill to mollify Mr. Brown. It may be that Mr. Brown was or will be told that the big repair bills were due to his drivers, or other employees, but Mr. Brown is too busy to conduct an investigation. So the dealer takes a loss in his service department, plus the loss of his time which, coupled



Get the Message to the Right Man

with a possibility that some future sales resistance may have been developed by the trouble, means some loss.

All of this leads us up to the point of the removing the kick from the kicker, and how James A. Inness accomplishes the feat. He is long on experience in



truck sales and service, and when about four years ago was appointed New York branch manager, he proceeded to whittle down sales resistance. As sales manager, he knew the reflex action of service that does not satisfy the customer. His service manager, H. E. Muller, knew the problems of his department. Both agreed that an inspection system that inspected, and coupled with good service, would greatly reduce costs to the customer and break down sales resistance created by lack of both.

### Who is Responsible?

Realizing the tendency of the owner, and his employees, to "pass the buck," Mr. Inness made a rule that when a sale was made the owner, individual or a firm, must designate who is to be responsible for the trucks. In other words, when a prospect is sold he is also sold on the importance of naming a person to whom the service station and dealer can look to in the event of trouble or misunderstandings. For example: In the case of Brown, Jones & Brown, they would have been requested to state who was to be responsible for the trucks. If James Martin was designated, all dealings would be with him and, consequently, when Brown, Jones & Brown kicked over the big bill, the service station would have "pinned the rose" on Martin because the service station would have ample evidence that Martin was at fault.

This one man responsibility is not a

Nº 750

**INSPECTION REPORT**

Car No. \_\_\_\_\_ Date \_\_\_\_\_

Owner \_\_\_\_\_

Address \_\_\_\_\_

Radiator Guard \_\_\_\_\_

Radiator \_\_\_\_\_

Fan \_\_\_\_\_

Crank \_\_\_\_\_

Motor \_\_\_\_\_

Compression \_\_\_\_\_

Valves \_\_\_\_\_

Bearings \_\_\_\_\_

Pistons \_\_\_\_\_

Pump \_\_\_\_\_

Carburetor \_\_\_\_\_

Governor \_\_\_\_\_

Gas Line \_\_\_\_\_

Gas Tank \_\_\_\_\_

Magneto \_\_\_\_\_

Wiring \_\_\_\_\_

Brake \_\_\_\_\_

Suspension Bolts \_\_\_\_\_

Clutch \_\_\_\_\_

Shifting Device \_\_\_\_\_

Transmission \_\_\_\_\_

Sub Frame \_\_\_\_\_

Hub \_\_\_\_\_

Radiator Pipe \_\_\_\_\_

Propeller shaft \_\_\_\_\_

Universal Joints \_\_\_\_\_

Frame \_\_\_\_\_

Worm \_\_\_\_\_

Worm gear \_\_\_\_\_

Worm bearing cap \_\_\_\_\_

Asse housing \_\_\_\_\_

Brake shaft \_\_\_\_\_

Brake springs \_\_\_\_\_

Radios rods \_\_\_\_\_

Spring clips \_\_\_\_\_

Spring bolts \_\_\_\_\_

Wheels \_\_\_\_\_

Wheel bearings \_\_\_\_\_

Bearing caps \_\_\_\_\_

Bearing axles \_\_\_\_\_

Drag link \_\_\_\_\_

Cross shaft \_\_\_\_\_

Front axle \_\_\_\_\_

Grease \_\_\_\_\_

Steer \_\_\_\_\_

Oiling & Lubrication \_\_\_\_\_

Foot brake \_\_\_\_\_

Emergency Brake \_\_\_\_\_

Throttle \_\_\_\_\_

Exhaust condenser \_\_\_\_\_

Inspector \_\_\_\_\_

C. The Inspection Sheets Are in Duplicate, But Copy is Not Sent Owner, But a Letter Mailed Explaining Condition, Need of Work, Etc.

new plan, generally speaking, for big companies have a transportation manager, but many do not. With the Inness plan the service station deals with but one man, whether it be the driver, owner or transportation manager. To this man is directed all letters, telephone messages, inspection reports, etc., and he is also sold by the salesman and the dealer's organization on his responsibility. Among other things he is told that when it comes to a final show down, excessive repair bills, etc., the "buck" will be passed to him.

### How Plan Works Out

It may be contended, where the driver is designated to look after the truck, that it is not good policy to go over his head, or show up his neglect to the owner. Some dealers cater too much to the driver, believing that if antagonized he will abuse the truck and try and shift the blame to the design or the dealer. Mr. Inness does not believe it is a good policy to allow a bad driver to continue to operate a good truck, and whenever one is found, whose bad habits cannot be corrected through courtesy, education, etc., the owner is advised to make a change. This may require diplomacy, but what better diplomacy is there to be had than actual cost figures. Every owner understands cost figures. Mr. Inness takes the stand that when he sells a truck he sells transportation, and service that keeps costs down. If the driver or owner prac-

SHOP ORDER

BROCKWAY MOTOR TRUCK CO. Nº 3110

NEW YORK

NAME \_\_\_\_\_ Date \_\_\_\_\_

ADDRESS \_\_\_\_\_

Charge to \_\_\_\_\_

Model \_\_\_\_\_ Car No. \_\_\_\_\_ Work ordered by \_\_\_\_\_

WORK

Nº 7800

STOCK REQUISITION

SHOP ORDER No. \_\_\_\_\_

OWNERS NAME \_\_\_\_\_ DATE \_\_\_\_\_

CAR NO. \_\_\_\_\_

PART NAME AND NUMBER \_\_\_\_\_

QUANTITY \_\_\_\_\_

APPROVED BY \_\_\_\_\_

RECEIVED BY \_\_\_\_\_

TIME CARD

RADIATOR

DATE \_\_\_\_\_ MECHANIC \_\_\_\_\_

JOB NO. \_\_\_\_\_ OWNER \_\_\_\_\_

WORK DONE \_\_\_\_\_

ON \_\_\_\_\_

OFF \_\_\_\_\_

ON \_\_\_\_\_

OFF \_\_\_\_\_

O. E. \_\_\_\_\_

Cost of Single Time \_\_\_\_\_ Hours \_\_\_\_\_

Cost of Double \_\_\_\_\_ Hours \_\_\_\_\_

Inspected \_\_\_\_\_

Tested \_\_\_\_\_

Approved \_\_\_\_\_

Showing Three Forms Employed by the Brockway Motor Truck Company

B. The shop order is in duplicate and operations are time-stamped, also as job moves from floor to floor and when completed. E. The material and parts requisition must be signed for by mechanic and need of parts approved by foreman who inspects unit before work is commenced. D. The time card is conventional, but that shown is for ascertaining material and time for radiator work and is a basis for a flat rate system.

BROCKWAY MOTOR TRUCK CO.

NEW YORK CITY

TROUBLE SHEET

Order No. \_\_\_\_\_ Date \_\_\_\_\_

Car No. \_\_\_\_\_

Owner \_\_\_\_\_

Address \_\_\_\_\_ Driver \_\_\_\_\_

COMPLAINT \_\_\_\_\_

ITEMS	WORK RECOMMENDED
STARTING CRANK	
MOTOR	
Compressor	
Connecting rod bearings	
Is motor tight in frame?	
Valves	
Carbon	
Tuning gears	
Piston rings	
Main bearings	
Crankshaft	
Piston pins and bushings	
Condition of gaskets	
Motor belt and ribs	
Is motor tight in frame?	
OILING SYSTEM	
Oil level	
Circulation	
Is oil strainer clean	
Condition of oil	
COOLING SYSTEM	
Radiator	
Pump	
Are all connections tight?	
Fan	
Fan belt	
CARBURETOR ADJUSTMENT	
Is choke properly adjusted?	
Gasoline line	
Gasoline tank	
IGNITION SYSTEM	
Tuning	
Spark Plugs	
Wiring	
Contact points	

### The Trouble Sheet Separates Ordered and Needed Work

It enables quickly noting work not done that was advised and sheet is used in inspection system. When driver comes in and leaves the sheet it is time-stamped.

tices those little tricks which increase costs, then it is the policy of Mr. Inness to get right down to brass tacks with the owner. It is much better to have a truck in the hands of a satisfied owner than with one who is dissatisfied, for the latter builds sales resistance. When that type of owner who neglects his trucks brings up the old story of "A punk truck, no good. Wish I had not bought it," Mr. Inness frankly tells the kicker that he had best do without trucks until he knows how to use and care for them. From which may be deducted that Mr. Inness has the courage of his convictions and is trying to build up a clientele of satisfied owners, not endeavoring to build volume of the kind requiring hard work to resell.

#### Taking the Kick Out

The chief factor in removing the kick is a time clock, one of those simple devices that stamps the date and records the hour and minute. Mr. Inness adopted the clock to record every transaction. Whenever a truck comes in for inspection, minor repairs or an overhaul, the trouble sheet, shown herewith, is filled out and the time clock is employed for stamping and recording the date. Let us assume that the driver says he wants the service brake linkage taken up. The shop order is, of course, filled out, but in the meantime the inside inspector starts to inspect the truck. The brake job is quickly completed and the driver is in a hurry to leave. When told the truck needs inspection, and that work reported by the outside inspectors has been attended to, and the driver still insists on departing, the trouble sheet is stamped "NO INSPECTION WANTED," and filed away with other records of the truck.

#### Getting After Responsible Man

Service Manager Muller immediately gets after the responsible man, the owner or transportation manager, advising him of the situation, also of the need of the work and a time record is made of the reminder. A letter is also sent and if the case is an obstinate one a call is made on the responsible party. These transactions are duly recorded and placed with the other evidence.

Similarly, if a truck be brought in for certain specified work, and the reports of the outside inspectors, and that by examination, show other work needed, the attention of the driver or person responsible is called to the work. Let us assume that three operations are ordered and five are needed. The three ordered are entered, also those recommended. Those advised but not done, show up on the sheet and the reasons why. The time stamp functions in this bit of clerical work also. Let it be assumed that later the neglect develops the usual big repair bill, and the head of the house registers a kick. The evidence is then dug up. It shows that the trucks were inspected from time to time, work advised and not done, and the time stamp shows the time and place. Furthermore, the records quickly show that the cost of maintenance was up to the responsible party, not the service sta-

tion or the design of the truck. This, says Mr. Inness, takes the kick out of the kicker, and has proven a very successful system.

#### Outside Inspectors

The outside inspectors are routed, use cars, and have serially numbered inspection books. Inspections are made principally by appointment and so executed as not to delay the trucks. The white inspection sheet is filed at the service station, but the copy is retained in the book for the inspector. No copy of the report is mailed the owner or responsible party, a letter being sent instead. Postal cards in duplicate are sent asking when and where truck can best be seen, and this system has worked out well. For the expressman, a special card has been devised, as this type of owner does not operate on a regular schedule.



The Evidence of the Time-Clock

Every truck which has not been inspected on the outside, and if permitted to come into the service station, gets an inspection. This service applies to the purchaser of a used truck of the same make as well. Consideration for the used truck has, according to Mr. Inness, built good will and resulted in sales.

The time stamp is extensively employed. When a job comes in, the shop order is time stamped. As the job or unit moves from department to department, or floor to floor, the stamp functions. The object of the stamp is to show conclusively the progress from the time the job is received until delivered. In other words, a record is desired throughout.

The shop order is made in duplicate and is with job until work is completed. Before work is started on the overhaul of a unit an inspection is made by the foreman or superintendent to determine whether any work or parts other than

estimated are required. If after such inspection, additional attention is required, the owner is notified and sold. All parts for a unit are issued after the inspection is made. These parts are locked by the workman in a special drawer. He is held responsible for parts. Every job gets two okeys before it is delivered. Hence, come-backs are rare.

#### Sales Follow Up Customers

Mr. Inness has his salesmen kept constantly in contact with his customers. If upon one of these interviews an owner complains about a bill, etc., the salesman requests time to call the office. With the card index the evidence is quickly forthcoming, and if the salesman cannot sell the owner on how the latter's "responsible man" was lacking, then the service station manager is called on. It is the policy of Mr. Inness never to let a kick get cold. "If," he says, "you supply evidence that you are on the job with service, and that the complaint is not warranted, you not only pin the rose where it belongs, but stop a real kick from developing."

One of the features of the service station system is the use of unit replacements. Radiators, carburetors, magnetos, etc., service units, are supplied and with no charge other than the labor involved in making the change. The same method obtains with crankshafts. If a customer's shaft is out of round and needs grinding, a stock shaft is installed which saves the delay contingent upon the work of grinding. The customer is, however, charged for the grinding operation and labor. This unit service is proving very satisfactory and is practiced generally. One of the things that was noticed by the writer when inspecting the service station was cleanliness in every department. There was also a paint department, for Mr. Inness believes that well painted trucks help sales. This article does not explain all of his ideas on service, of plans to eliminate the human equation and obtain less maintenance costs. He has a lubrication plan in view of which description will appear in a later issue. Mr. Inness is manager of the Brockway Motor Truck Company, New York City.



Who Said the Truck Isn't Allied to the Railway Business?

In order to locate a locomotive used in logging operations to a new timber claim a truck and trailer was used by a Washington company. The locomotive, 31 ft. in length with a width of slightly over 9 ft., weighed 33 tons as loaded on a ten-ton truck with a five-ton trailer. By substituting a timber reach for the usual connection between the tractor and trailer an increase in distance was obtained. The locomotive was lifted from its trucks by a derrick and mounted on the truck and trailer.



# Make the Draining of Crankcase Oil a Simple Operation

## Frequent Neglect in Draining of the Crankcase Oil is Largely Due to a Natural Avoidance by Uninterested Operators of a Disagreeable Task

### *The One Remedy is for the Engineer to Design an Easy and Practical Device for Drawing Off Oil*

By C. P. SHATTUCK\*

IN June, 1919, the COMMERCIAL CAR JOURNAL called the attention of the truck industry to the need of better oil draining facilities with the motor truck plant. The editorial in part is produced herewith. This need still exists as practically no progress has since been made along this line.

The value of a high grade oil plus a simplified lubrication system is too well known for comment. Campaigns have been conducted by the refiners to teach the truck user the advantages of using a high grade oil. Truck manufacturers have compiled instruction books dealing with the subject. But despite these efforts the average truck operator does not heed the advice, for the average owner continues to use an oil in the crankcase of the engine considerably longer than efficiency and low up-keep costs warrant because of the great TROUBLE AND DIFFICULTY ATTENDANT UPON DRAINING CRANKCASE.

When the truck engineer provided a pipe plug for draining the crankcase it was a big improvement over the petcock, or petcocks, for the possibility of breaking off the petcock or draining of the supply through partial opening was avoided, but in supplying the pipe plug the engineer failed to take into consideration the human equation, the tendency of the average operator to procrastinate. Naturally uninterested truck operators will avoid a disagreeable job wherever possible. The writer made a partial survey among truck operators, asking drivers of

various makes and capacities how frequently they drained the crankcase and how many estimated miles the truck was operated before the crankcase was drained.

The answers were surprising and revealed that the majority operated from 500 to 1000 miles longer with the same oil supply than directed by the maker of the truck. The answer of several is typical and was: "It's a h—l of a job. It's up

It may be argued that the owner investing in a \$5000 piece of machinery should protect his investment by seeing that the instructions of the maker are complied with. It may also be said that the dealer has a moral responsibility. Both should protect the investment, and many do, but where there is one that does there are five others who do not, because of the human

equation. The average driver who cares for his truck does not relish the task of crawling under and the messy work involved. Even where it is done the time required to drain the crankcase, wash it out and renew the oil supply requires too much time for such a simple operation. And it is too expensive if performed at the service station

*"It is a well known fact that the frequent draining of the crankcase oil is neglected—more so on trucks than on passenger cars. The reason for this is, that in the majority of trucks the draining of the crankcase oil involves an undue amount of labor. The average operator is not inclined to crawl underneath the truck to loosen the crankcase oil plug, for with him it is a case of 'out of sight, out of mind.' Of course, when trucks are given periodical attention this matter is taken care of, but the individual operator is apt to pay very little attention to this condition. There is no reason why the draining of the crankcase should not be taken care of by an arrangement workable from under the hood. A great many engine troubles could be eliminated if the crankcase oil was changed frequently. If the draining job could be accomplished with less labor it would materially help towards keeping truck engines in better working condition."*

Editorial Which Appeared in the June, 1919, COMMERCIAL CAR JOURNAL

to the boss so we should worry." It may be contended that the service station, the inspection system, corrects this fault but the inspector has no means of verifying the statement of the driver. True, where periodical attention is given, and it provides for draining the crankcase, such as an overhaul of the engine, we find new oil employed but many crankcases are replaced after taking up a bearing, etc., with the old lubricant.

#### Squarely Up to the Engineer

The crankcase would be more frequently drained and greater efficiency and lower up-keep cost obtained thereby, if the truck engineer would incorporate in his engine design a simple, easy and practical device for draining, such as is "workable from under the hood," as pointed out in the COMMERCIAL CAR JOURNAL'S editorial. Instruction books, educational propaganda and the repair bills, due to improper lubrication, haven't and won't eliminate the human equation referred to.

with a labor rate of from \$1.25 an hour up.

There is a more vital need for changing the oil in the crankcase today than formerly because of the fact that with the majority of present day gasolines having an end point above 400 deg. Fahr., part of the vapors are not exploded. These vapors are either left in the explosion chambers or are pumped past the piston rings into the oil sump, there diluting the oil to such an extent that after a few hundred miles its body has been so thinned out that loss of compression occurs.

The dilution of the oil is more pronounced in winter because of the more frequent use of the choke when starting. It is estimated by one oil authority that with frequent use of the choke the dilution in the first 50 miles with a fresh supply of oil is from 10 to 25 per cent. With the truck engine, however, it is said that the percentage is less, as the engine is not started so frequently, if allowed to run by the average driver.

\*Insofar as the writer could ascertain there are but three makes of passenger cars, the engines of which are equipped with convenient means for draining the crankcase. These are the Marmon, Franklin and the 1921-22 Buick.

Under the conditions cited, with a leakage of burned gases past the pistons into the crankcase, more or less water vapors in the products of combustion condenses and settles to the bottom of the oil sump. This supply of water will bring about a complete emulsification of that part of the used oil that will emulsify. The tendency towards emulsification is greater in winter than in summer, for in hot weather the heat of the lubricant in the crankcase is sufficient to prevent condensation of the water vapors which are expelled through the breather pipes.

While it is held that high grade oils will not emulsify with water, the best will, more or less after it has been used in the crankcase, and the character of the emulsion may vary from a perceptible thickening to that of a jelly. When the latter condition obtains there is a possibility of the emulsion completely clogging the inlet side of the circulating pump, screens and oil ducts leading to the bearings. Instances have come to the attention of the writer where such conditions existed. There is another effect of the water vapors and that is on the supply. It may be that the indicator will show a "Full" supply, or higher, when the supply is not for water. Condensation raises the oil level, leading the driver to assume that the supply is normal, which it is not.

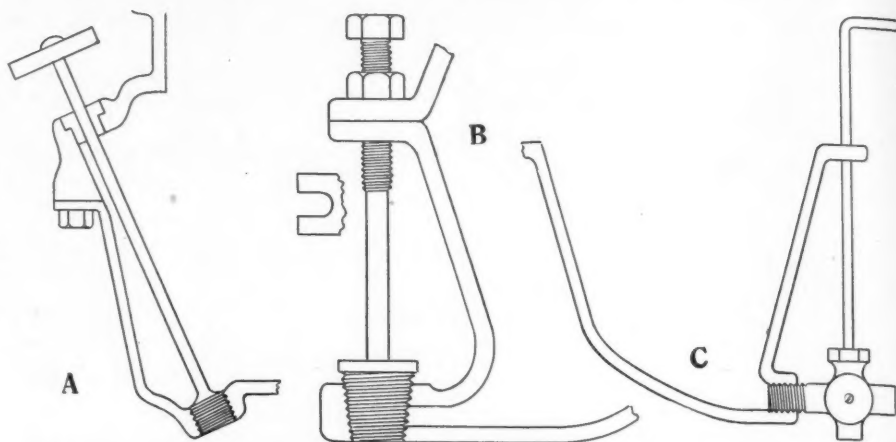
#### Sump Temperatures and Sedimentation

The greatest enemy of lubricating oil is heat, as it breaks down its qualities. One of the functions of oil is to cool the frictional surfaces and when the sump temperatures rise above normal, sedimentation occurs, the oil decomposes. Sediment has no lubricating value. On the other hand it may clog the oil ducts. The temperature of the oil sump varies from 110 to 240 deg. Fahr., and decomposition of the lubricant occurs at or about 200 deg. It is held that the ideal temperature would be about 60 deg. but this is not practical. The average is held to be about 125 deg. It is held by one oil engineer that the sediment will be as high as 20 per cent with 3000 miles of operation. The combined effect of sediment and emulsification will be more pronounced, it is held, in the force feed system of lubrication where centrifugal action impairs circulation of the mass.

#### Force Feed is Increasing

According to the specification tables of the COMMERCIAL CAR JOURNAL, and classification of lubricating systems, force feed is employed on 51.3 per cent of models, 35.5 are force feed and splash, and 13.2 per cent splash. Force feed leads in all capacity models with the exception of 1000, 1500 lb. and 1¼-ton models. The figures are as follows, and classification is made of the force feed, force feed and splash, and splash:

	Force Feed		
	Force Feed	Force Feed and Splash	Splash
	per cent	per cent	per cent
1000 lb. ....	0	75	25
1500 lb. ....	29	62	9
1-ton ....	27	72	1
1¼-ton ....	37	0	63
1½-ton ....	39	38	13
2-ton ....	50	31	19
2½-ton ....	59	23	8
3-ton ....	77	21	12
3½-ton ....	52	28	10
4-ton ....	73	26	1
5-ton ....	67	22	1
5½-, 6-, 7-ton....	60	20	20



Three Suggested Constructions Which Would Facilitate Draining the Crankcase

A. Operable under the hood, has 7/8-in. pipe plug and permits of removal of lower half of crankcase. This design is the idea of A. J. Gillespie, Cleveland, an S. A. E. member. B. Pipe plug design with lock nut to prevent movement. C. Self-locking petcock with 7/8-in. opening and operated by handle supported by crankcase.

#### Engineers Favor Better Design

That engineers favor the incorporation of better crankcase draining facilities, and are awake to the fact that it would eliminate many engine troubles, reduce operating costs, etc., is evidenced by the canvass made of the industry by T. A. Waerner, chief engineer of the Tide Water Oil Sales Corp., who, in August, sent 5000 letters to truck, passenger car and tractor engineers, manufacturers and members of the S. A. E., drawing their attention to the lack of proper facilities. Of the 3000 replies but a very, very small number were not heartily in favor of the installation of proper draining devices and some stated that it would be in designs contemplated or was in construction. It is believed that few if any of the truck engines now in service have a design of the type not requiring time and trouble.

#### Not Expensive to Install

Those who have given the subject consideration say that a device could be installed with little expense and a number of engineers submitted their ideas, some of which are shown herewith. These designs provide for location at a point in the crankcase so as to provide for complete drainage, and are operable from under the hood. With at least a 7/8-in. standard pipe plug they would permit of easy and rapid draining of the crankcase even with the oil cold. One engineer estimates that a suitable design could be incorporated at a cost of 40 cents, which would be fool proof and practical insofar as loss of lubricant is concerned, as compared with the conventional plug. The majority of replies received by engineer Waerner favored the pipe plug, although some believed that with the proper design a petcock with sufficient opening would be practical, provided it could be so locked as to avoid the possibility of its partially opening when the engine was operating.

#### What About Old Trucks?

While it is held that it will not be possible to completely drain the crankcase where it has troughs, the amount of old oil that would remain would be a negligible factor. If we are to expect that new and future engines will have incorporated the draining device, and that it will make

for the elimination of those engine troubles due to not draining the crankcase, what can be done with the thousands of trucks in service which are not equipped? And how can their owners and drivers be educated? If educational campaigns and instruction books fail, can a plan be devised which will be better? These factors will be discussed in a forthcoming article in an earlier issue of the COMMERCIAL CAR JOURNAL.

#### September Truck Exports Show Gain Over August

A decided increase in trucks exported to foreign countries by the United States in September over the previous month, August, is shown by statistics issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce. September showed a total of 239 finished trucks and 233 chassis, valued at \$238,610 and \$243,054, respectively, against August shipments of 241 finished trucks at \$268,691 and 140 chassis at \$165,361.

A greater number of countries were the recipients of trucks in September than in August. Finished trucks went to 23 nations in September, compared with 15 nations in August. The value of automobile parts shipped in September was \$2,570,860, and in August \$1,786,886.

Canada led the field in September, with 63 finished commercial vehicles and 32 chassis. In August she received 50 finished cars and 39 chassis.

#### Equipment Show for Cincinnati

Fully \$1,350,000 worth of accessories and equipment will be placed on display at the first automotive accessory show of the Cincinnati Automotive Trades Association at the Music Hall, Cincinnati, O., November 26 to December 3. The exhibit is to occupy 35,000 sq. ft. of floor space.

Particular emphasis is to be laid on truck equipment, with winter accessories predominating. The show is under the direction of John J. Behle, 727 Union Central Bldg., Cincinnati.





# EDITORIALS



## Taking a Tip From the Junk Man

**T**O some it seems unbelievable that there is money in the junk business. It is really surprising that there should be enough money in old scrap to warrant the use of motor trucks by the modern junk dealer. There wouldn't be any money in the junk business, however, if the junk man didn't know his business. But he does. Why? Because he constantly studies market values. He knows what he can realize from the junk he buys. He knows the market value of metals. He knows what he can get in cold cash for every pound of scrap he buys. He knows the value of metals, paper, cloth, glass, rubber, etc., because he follows the market reports carefully. He is a second cousin to the pawnbroker. He buys at a low price and sells at a high price. He makes a profit.

Figuratively speaking, many truck dealers are in the junk business, but the serious part of it is that they have purchased a lot of junk, in the form of worn out trucks, at high prices. How much better to the advantage of the truck dealer if he had consulted with the junk dealer before making some of the allowances he has made in the past. We believe that the average dealer will do well if he will consult with the junk dealer when making a trade-in allowance. Even if the dealer allows the customer the difference between what the junk man offers and what the customer expects, his equity in the old truck will be considerably less and the customer will feel satisfied that he has received a square deal.

## Regarding Pirate Parts

**E**VER so often the subject of pirate parts comes up for discussion. Just about the time this number comes off press the Service Managers' Association is discussing it at their annual meeting. Whether the service men will find a solution to the problem remains to be seen. At any rate, the subject, whenever discussed by any representative group of the industry, bids fair to bring down upon the heads of the so-called pirate a considerable amount of condemnation. Incidentally the pirate keeps right on doing business.

Let's give this pirating business consideration from an impartial viewpoint. First of all, consider the fact that the word pirate is wrongly used. "Sub-

stitute" part would be better. The accepted meaning of the term "pirate" is robber on the high seas. As such he is not to be confused with the gentry of the automotive industry who offers for sale, parts or equipment that are the means of helping many dealers and repairmen make a profit on a repair job at a cheaper figure than would be possible if the original factory part were employed. We assume of course that the part in question compares identically in size, shape and material with the original factory part. In many cases practically the only difference between the factory part and the substitute part lies in the brand name stamped thereon. The name stamp, however, does not necessarily insure the correct functioning of that part.

Granted that the parts are identical, why therefore should the dealer or the repairman resort to the use of parts other than those supplied by the factory? The answer is very apparent to most of the trade, but the very ones who criticise the "pirate" parts manufacturer the most are the very ones who are doing nothing definite to curb the "pirates'" activities.

Just as long as the vehicle manufacturer insists upon charging a whole lot more for a part than it is actually worth, just so long will the dealer and repairman and the owner use substitutes for factory parts. The "pirate" parts problem is one mostly concerning price. Education will be needed to show the dealer and the repairman the folly of using inferior and incorrectly fitting parts, but when the situation resolves itself into whether or not the dealer should buy his parts directly from the vehicle manufacturer instead of the parts manufacturer, or from an outside concern that makes a reputable product, the question of price is the deciding factor. The dealer has in mind the saving he can realize and he doesn't give a continental whose name is stamped on said part if the part makes good. Of course the dealer will charge for such parts at factory or parts list price, but if the factory discounts to the dealer were large enough we doubt if the average dealer would buy outside of the factory.

Sooner or later the truck manufacturer must realize that many replacement parts are excessively high priced. Even the owner, knowing perhaps very little about automotive parts manufacturing costs, is very much surprised at a charge of two to three dollars for a small casting or a piece of drill rod which actually should be sold at less than a dollar

with a reasonable profit. Is it any wonder that the substitute is employed? Is it any wonder that the owner shops around for a substitute when he knows that he is being gouged? Is it any wonder that the so-called "pirate" is welcomed with open arms by some in the trade? It is a fact that some of the industry's most influential dealers buy thousands of dollars worth of parts each year direct from the outside concerns, who are considered pirates by the manufacturers, but who are really furnishing a substitute at a better price.

The only way in which the vehicle and the parts

manufacturers can ever hope to control the "pirate" parts situation is for them to sell replacement parts at prices which are fair. The bill is ultimately paid by the owner and the owner is getting wiser daily.

One thing which the truck manufacturers must not forget is that the buyer is entitled to the lowest possible prices for upkeep and service work. Certainly if the manufacturer will not make an effort to give the customer the best consideration in this respect the dealer must be excused for his attempt to supply the customer with parts at prices that will help to build up a line of satisfied customers.

#### SHOWS

- November 28 to December 3, 1921—Des Moines, Ia. Fourth Annual Tractor Show, auspices of Iowa Implement Dealers' Assn., at Coliseum. Trucks, Tractors and Power Farming Machinery. T. F. Wherry, Mgr., 664 38th St.
- January 7 to 14, 1922—New York, N. Y. Annual Automobile Show of the National Automobile Chamber of Commerce, at Grand Central Palace. Passenger Cars and Accessories.
- January 9 to 14, 1922—New York, N. Y. First annual show of the Automobile Body Builders' Association, 12th Regt. Armory. Exhibit of Commercial and Passenger Car Bodies. R. D. Mitchell, Sec., 4106 Woolworth Bldg.
- January 9 to 20, 1922—New York, N. Y. First Annual Retail Dealers' Auto Equipment Show, at Hotel Imperial, auspices of National Retail Merchants' and Buyers' Assn. Accessories and Automobile Clothing. George T. Keen, Sec., Hotel Imperial.
- January 14 to 21, 1922—Buffalo, N. Y. 19th annual show at 74th Regt. Armory, auspices of Buffalo Automobile Dealers' Assn.
- January 16 to 22, 1922—Oakland, Cal. Fourth annual show of Alameda County Auto Trade Assn., Oakland Auditorium (25,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. Robert W. Martland, 407 Pacific Bldg., Oakland.
- January 19 to 25, 1922—Milwaukee, Wis. Annual Automobile Show of the Milwaukee Automotive Dealers' Assn., Auditorium (100,000 sq. ft.). Passenger Cars, Trucks and Accessories. Bart J. Ruddle, 316 Brumler Bldg.
- January 23 to 29, 1922—Portland, Ore. Annual Show of the Portland Automobile Dealers' Assn., Municipal Auditorium.
- January 28 to February 4, 1922—Chicago, Ill. Annual Automobile Show of the National Automobile Chamber of Commerce, at the Coliseum.
- January 30 to February 4, 1922—Minneapolis, Minn. National Tractor Show, held annually.
- January 30 to February 4, 1922—London, Ont., Canada. Second Annual National Motor Show of Western Ontario, Armory and temporary buildings, auspices of Automotive Retailers' Assn., London, Ont. Passenger Cars, Trucks, Tractors, Accessories, Motorcycles and Bicycles. T. C. Kirby, Tecumseh Hotel.
- February, 1922 (tentative date)—Madison, Wis. Ninth Annual Show of the Automotive Dealer Division, Assn. of Commerce. Passenger Cars, Trucks and Accessories. Don W. Mowry, Cartwell Bldg.
- February 3 to 10, 1922—Minneapolis, Minn. Fifteenth Annual Automobile Show, auspices of Minneapolis Auto Trade Assn. Passenger Cars, Trucks and Accessories. W. R. Willmot, 709 Andrus Bldg., Minneapolis.
- February 6 to 9, 1922—Scranton, Pa. Annual Truck Show, under the auspices of the Scranton Motor Trades Assn., Armory (50,000 sq. ft.). Hugh B. Andrews, Mgr., 411 Board of Trade Bldg.
- February 6 to 11, 1922—Winnipeg, Canada. Second Annual Automotive Equipment Show, auspices of Western Canada Automotive Equipment Assn., Board of Trade Bldg., Auditorium. W. L. Williams, New Stovel Bldg., Winnipeg.

#### Coming Events

- February 11 to 18, 1922—San Francisco, Cal. Sixth Pacific Automobile Show, auspices of Motor Car Dealers' Assn. of San Francisco, at Exposition Auditorium (70,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. G. A. Wahlgreen, 215 Humboldt Bank Bldg., Mgr.
- February 11 to 18, 1922—Atlanta, Ga. Second Annual Great Southern Automobile Show, auspices of Atlanta Automobile Assn., Auditorium Armory. Passenger Cars, Trucks and Accessories. Virgil W. Shepard, 305 Connolly Bldg., Show Mgr.
- February 11 to 18, 1922—Kansas City, Mo. Annual Automobile Show of the Kansas City Motor Car Dealers' Association, at the Overland Bldg. E. E. Peake, Sec., 1019 Gloyd Bldg.
- February 14 to 17, 1922—Philadelphia, Pa. 21st Annual Exhibit and Convention of the Pennsylvania and Atlantic Seaboard Hardware Assn., Inc., at the Commercial Museum. Automobile Accessories, etc. Sharon E. Jones, Sec., 1314 Fulton Bldg., Pittsburgh, Pa.
- February 18 to 25, 1922—Albany, N. Y. 13th Annual Show, auspices Albany Automobile Dealers' Assn., at State Armory. Passenger Cars, Trucks and Accessories. J. B. Wood, Secy., 28 Howard St.
- February 20 to 25, 1922—Duluth, Minn. Seventh Annual Show of Duluth Auto Trade Assn., Duluth Armory Bldg. (70,000 sq. ft.) Passenger Cars, Trucks, Tractors and Accessories.
- February 20 to 25, 1922—Deadwood, S. Dak. Tenth Annual Black Hills Auto Show of the Deadwood Business Club, Auditorium. Passenger Cars, Trucks, Tractors and Accessories.
- February 20 to 25, 1922—Louisville, Ky. Fourteenth Annual Automobile Show, Jefferson County Armory (54,000 sq. ft.). Passenger Cars and Accessories. George T. Holmes, Inter-Southern Bldg.
- February 27 to March 2, 1922—Bethlehem, Pa. Seventh Annual Truck Show of Bethlehem Auto Trade Assn., Coliseum. Trucks, Tractors and Accessories. J. L. Elliott, Mgr., 1308 Norway Pl.
- February 28 to March 4, 1922—Wichita, Kan. Third Annual Show of the Wichita Motor Trade Assn., at Wichita Exposition Bldg. (100,000 sq. ft.). Passenger Cars, Trucks and Accessories. Guy H. Johnson, Secy., P. O. Box 372.
- March 6 to 11, 1922—Indianapolis, Ind. 24th Semi-annual Show of the Indianapolis Auto Trade Assn., Auto Show Building (85,000 sq. ft.). Passenger Cars, Trucks and Accessories. John B. Orman, Mgr., 338 N. Delaware St.
- March 11 to 18, 1922—Newark, N. J. 14th Annual Show at the First Regt. Armory (60,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. Clyde E. Hoggate, Mgr., 343 High St.
- March 11 to 18, 1922—Boston, Mass. Twentieth Annual Automobile Show of the Boston Automobile Dealers' Assn., Mechanics Bldg. (125,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. Chester I. Campbell, Mgr., 5 Park Sq.

March 11 to 18, 1922—Bronx, N. Y. Bronx County Automobile Show, at 105th Field Artillery Armory, 166th St. and Franklin Ave. Passenger Cars, Trucks and Accessories. H. G. Stiles, Mgr., 2483 Tiebout Ave., Bronx.

#### CONVENTIONS

- Chicago, Ill., December 6 to 8, 1921—Annual Meeting of the American Petroleum Institute at the Congress Hotel.
- Chicago, Ill., January 17 to 20, 1922—Annual Convention and Exhibit of the American Road Builders' Assn., at the Coliseum. Address Sec., 11 Waverly Pl., New York City.
- Chicago, Ill., January 30 to 31, 1922—Fifth Annual Convention of the National Automobile Dealers' Assn., La Salle Hotel.
- Chicago, Ill., January 31 to February 4, 1922—Annual Convention of the Automotive Electric Service Assn., at the Hotel La Salle.
- Columbus, O., December 13 to 16, 1921—Fifth Annual Convention and Exhibit of the Ohio Automotive Trade Assn., Memorial Hall and the Elks' Home. E. J. Shover, Sec. Mgr., 403 Central National Bank Bldg., Columbus.
- Detroit, Mich., December 2 to 3, 1921—Annual Convention of the National Association of Motor Truck Sales Managers, at the Hotel Statler. Don F. Whittaker, Gen. Mgr., 1157 Book Bldg., Detroit.
- Greenville, S. C., December, 1921—Semi-Annual Meeting, South Carolina Automotive Trade Assn.
- New York, N. Y., November 15 to 16, 1921—Convention of the Factory Service Managers, National Automobile Chamber of Commerce. Address, Marlin-Rockwell Bldg., Madison Ave. & 46th St., New York City.
- New York, N. Y., January, 1922—Final Meeting of the Automotive Wood Wheel Manufacturers' Assn.
- New York, N. Y., January 10 to 13, 1922—Annual Meeting of the Society of Automotive Engineers, Engineering Society Bldg.
- Trenton, N. J., May, 1922—Annual Convention of the New Jersey Automotive Trade Assn. H. S. Moore, Sec.-Treas., Trenton.

#### FOREIGN EVENTS

- Brussels, Belgium, December 3 to 15, 1921—Annual Belgian Automobile Show.
- Calcutta, India, December 19 to 24, 1921—Automobile Exhibition of the Motor Trade Association of Calcutta. Buildings to be erected. Passenger Cars, Trucks, Tractors, Motorcycles and Accessories.
- Rio De Janeiro, Brazil, September, 1922—Automobile Show with the Brazilian Centenary.
- Santiago, Chili, March, 1922—Annual Automobile Show.
- Shanghai, China, November 26 to Dec. 3, 1921—First Annual Automobile Show.
- Scheveningen, Netherlands, May 1 to 15, 1922—Second Annual Automobile Exhibit. Secretary, No. 185 Spui, The Hague.



# News of the Trade in Brief

Personal, Factory and Dealer Notes on Page 82

## Motor Industry Held Its Own in September

Figures made public by the Motor and Accessory Manufacturers' Association, based on the official monthly financial survey, indicate that during September the automotive industry held its own.

Sales of parts and equipment, as reported by 300 representative manufacturers dealing with the principal car and truck makers, declined 1.09 per cent during September, as against August. In the two preceding months increases of 1 per cent had been registered, and in June there had been a 15 per cent drop.

The temperature chart of the industry, determined by the dead-reckoning financial and credit reports received at association headquarters, therefore continues to maintain a healthful level, despite seasonable obstacles and the many factors in the general business situation retarding sales.

With respect to the total past due accounts of the automobile passenger car and truck manufacturers, as reported by their units and parts-suppliers, the curve is virtually constant, the exact change being an increase of 22-100 of one per cent during September. The totals of notes outstanding, however, increased approximately 5 per cent.

The percentage changes for the last nine months follow:

Comparative Figures for 1921

Month	Per cent Change*	Per cent Change†	Per cent Change‡
February	66.15 Inc.	17.07 Dec.	39.08 Inc.
March	93.30 Inc.	16.57 Dec.	16.38 Dec.
April	32.93 Inc.	4.49 Dec.	5.94 Inc.
May	00.13 Inc.	15.64 Dec.	16.77 Dec.
June	15.19 Dec.	4.79 Inc.	10.37 Dec.
July	1.68 Inc.	10.79 Inc.	7.90 Dec.
August	1.31 Inc.	17.06 Dec.	5.30 Dec.
September	1.09 Dec.	00.22 Inc.	5.24 Inc.

\*Purchases of parts, units, equipment, etc., by automobile passenger car and motor truck makers from 300 parts and accessory manufacturers by months—per cent change.

†Totals of past due accounts reported—percent change.

‡Totals of notes outstanding—per cent change.

## Body Builders to Exhibit in January

The first annual exhibition of the Automobile Body Builders' Association will be held in New York City from January 9 to 14, 1922. The exhibit will consist of commercial and passenger bodies, together with the material and parts that enter into their construction, trimming and finishing. The opportunity to exhibit will not be confined to members of the association but will be extended to those to whom special invitations are sent.

The show is to be held in the 12th Regiment Armory, located at Columbus Ave. between 61st and 62nd Streets, a very desirable location in view of the fact that it is in the center of the New York automobile section. Preliminary plans are in the hands of F. D. Mitchell, secretary-treasurer, 4106 Woolworth Bldg.

## Bus Trip Demonstrates Cheapness of Motor Transportation

A significant bus test was recently undertaken by the International Motor Co., 25 Broadway, New York City, with members of the Metropolitan Section of the Society of Automotive Engineers.

This test took the form of a trip from New York City to Aberdeen, Md., and return, a distance of 352 miles. The journey was made in an International Motor E25 "AB" demonstrator bus equipped with the LM Shock Insulator. The time consumed covered parts of three days, the total being 18 hr. at an average running speed of 19 m.p.h.

The most interesting feature was the matter of cost. The entire outlay of the trip for gasoline, oil, wear on tires, depreciation on cost of bus and driver's wages and expenses was, with 22 of the 25 seats occupied, less than 1¼ cents per passenger mile. The railroad coach fare is about four cents per mile or more than three times as much.

The party was composed of 22 members of the S. A. E., who used this method of transportation in going to the demonstrations of Ordnance equipment given before the Society by the War Department at the Aberdeen Proving Ground, October 7.

## Buses to Act as Trolley Feeders

The street railway company at Rockford, Illinois, is to be permitted to continue, by the action of the city council, to permit the company to operate a line of motor buses as feeders. These cars will be placed in sections of limited population where it has not been desirable to construct extensions. They will pick up patrons and transfer them to the trolley cars. By this action, the city council goes on record, recognizing the motor bus as an adjunct to the trolley cars and places the bus system under the single management. The action is experimental and was a disappointment to the Fay Bus Company, which has been seeking exclusive service. One year's tryout of the new plan is allowed.

## Record Attendance at St. Louis Show

One hundred and five trucks and 540 passenger cars formed part of the exhibit of the fall automobile show held by the St. Louis Automobile and Manufacturers' and Dealers' Association at St. Louis, the week of October 17. According to Capt. Robert E. Lee, manager of the exhibit, the total attendance was 107,000, a record-breaking figure. A surprisingly large number of sales were made as a result of the exhibition.

## War Trucks Given to States for Road Work

Virtually all the surplus vehicles turned over by the War Department to the Department of Agriculture for distribution among the various States for road building purposes have been distributed through the Bureau of Public Roads. Up to July 1, last, a total of 22,577 motor vehicles had been so distributed.

These vehicles, consisting for the most part of trucks, are a part of the war materials originally intended for use in France and distributed under the Wadsworth-Kahn Bill among the various States, the sole condition attached to the distribution being that they should be used only for road building purposes.

The total number of vehicles so far allotted to the States approximate 528,000. Up to July 1 last there had been distributed 21,124 trucks and 3,229 automobiles. Distribution of the motor vehicles among the various States up to July 1 was as follows:

Alabama .....	497	Nevada .....	244
Arizona .....	302	New Hampshire .....	108
Arkansas .....	457	New Jersey .....	368
California .....	690	New Mexico .....	573
Colorado .....	422	New York .....	1,150
Connecticut .....	146	North Carolina .....	552
Delaware .....	62	North Dakota .....	333
Florida .....	273	Ohio .....	899
Georgia .....	723	Oklahoma .....	502
Idaho .....	303	Oregon .....	338
Illinois .....	1,043	Pennsylvania .....	973
Indiana .....	652	Rhode Island .....	50
Iowa .....	665	South Carolina .....	349
Kansas .....	692	South Dakota .....	374
Kentucky .....	459	Tennessee .....	544
Louisiana .....	521	Texas .....	1,337
Maine .....	205	Utah .....	261
Maryland .....	228	Vermont .....	105
Massachusetts .....	226	Virginia .....	448
Michigan .....	743	Washington .....	346
Minnesota .....	642	West Virginia .....	251
Mississippi .....	430	Wisconsin .....	521
Missouri .....	760	Wyoming .....	257
Montana .....	443		
Nebraska .....	510	Total .....	22,577

## Ajax Absorbed by Walker-Johnson

Negotiations have been completed whereby the Walker-Johnson Truck Co., of Woburn, Mass., has acquired the Ajax Motors Corp., of Boston. The consolidation permits the new firm to market a one-ton model, an Ajax product as well as the standard line of Walker-Johnson trucks.

Watson J. Walker is to head the concern as president, with Chester T. Bates as chief engineer. Stockholders of the combination will number over a thousand. Shipments of Walker-Johnson trucks for the first six months of 1921 were 52 per cent greater than a corresponding period of 1920.

The expansion plan contemplates the erection of additional buildings at Woburn and the establishment of sales and service branches in the principal New England cities. The Boston sales office is located at 843 Beacon Street, with Hazen G. Keith, vice-president of the company, in charge.

## Pierce-Arrow Men Bid Farewell to George M. Graham

Officers, representatives of the board of directors and executive heads of the sales and manufacturing departments of the Pierce-Arrow Motor Car Co. gathered at the Ellicott Club, of Buffalo, October 27, to bid good-bye to George M. Graham, vice-president of the company. Mr. Graham has resigned to accept the vice-presidency of the Chandler Motor Car Co., of Cleveland, taking charge of the sales and advertising division. More than 200 men were present.

"I am leaving the Pierce-Arrow Company at the top of my belief in it," said Mr. Graham. "I know that Pierce-Arrow faces even greater achievements than ever before, but I feel that there will be a quicker accumulation for me in the field of quantity production."

Colonel Charles Clifton, chairman of the board of directors, expressed the regret of his association and of the company organization at the departure of Mr. Graham, declaring that he had won a national reputation during his five years of residence in Buffalo.

Robert O. Patten, truck sales manager of the company, introduced the speakers, who included John F. Guider, chief of production; Myron E. Forbes, treasurer; Colonel George W. Mixter, president, and L. E. Corcoran, passenger car sales manager. Others at the table included Robert F. Coleman, Joseph C. Dudley, C. D. Cowles, T. J. O'Rourke, Fred C. Wells, E. F. Himmele, Charles Sheppy and Walter P. Cooke.

## Reductions in Size of Policies Announced

Reductions amounting to 50 per cent in the size of automobile insurance policies were announced at the annual conference of National Automobile Underwriters, held in New York City. It was explained that while policies issued last year would be continued, underwriters throughout the country were more cautious in renewing or issuing policies.

It was the consensus of opinion that last year was unusual in the automobile insurance business because of the violent changes which took place and the resulting experiences of the companies. All agreed, however, that the worst had been passed and that with new restriction imposed by legislation in many states there would be an improvement.

## Vacuum Cup Tires Reduced

A downward revision in prices covering Vacuum Cup fabric and cord casings, also "Ton Tested" inner tubes has been announced by the Pennsylvania Rubber Co., of Jeannette, Pa., effective Nov. 2. The company states that no fixed discount has been used in reaching the new schedule but that the revised rates are based on the individual cost of the tires and tubes as manufactured at the Pennsylvania plant.

## Need for Greater Standardization Advocated

Part of the tremendous waste in distribution in this country can be eliminated by standardization of the quality, quantity and variety of products, Alvin E. Dodd, manager of the Domestic Distribution Department of the Chamber of Commerce of the United States, told the National Association of Purchasing Agents at the annual meeting just held at Indianapolis.

According to Mr. Dodd, the work of the purchasing agents would be simplified if commodities were more scientifically "graded." In unnumbered instances, he said, there is no standard at all to which a purchase may be related.

"More and more the purchasing agents have come to rely upon a certain 'house' as the criterion for everything in its line. Its product establishes the 'grade' of all others of a like kind. It may be belting or rope or chain, or hardware or shirts or awnings. Sometimes the price is a little more, but the purchasing agent knows before the goods are shipped exactly what he is going to get. And it is this confidence on the part of their customers which allows manufacturers to keep their works going when their competitors are shut down tight."

Traffic in one of the principal thoroughfares of New Orleans was held up while a procession went by. The procession was rather long and was made up wholly of automobiles in which robust gentlemen, all dressed up and wearing large badges on their breasts, sat in state. They were delegates to the National Convention of Horseshoers held in the Crescent City.

Apparently the delegates did not appreciate the inappropriateness of parading in automobiles, the vehicles that have put the kibosh on the horseshoe.—*Spillane, Public Ledger.*

## Curtiss is Head of Electrical Specialties Co.

C. W. Curtiss, formerly general manager of the Splitdorf Electrical Co. and later president and general manager of the Van Sicklen Speedometer Co. until its sale to the Stewart-Warner Speedometer Corporation, has taken a substantial interest in and been elected president of the Tiffany Manufacturing Co., of 50 Spring Street, Newark, N. J.

Associated with Mr. Curtiss are Paul J. Landemare, secretary and treasurer, formerly treasurer of the Splitdorf Electrical Co. and later controller of the Van Sicklen Speedometer Co., and Carl T. Mason, chief engineer, formerly chief engineer of the Splitdorf Electrical Co.

The Tiffany Manufacturing Co. manufactures a line of high-grade automotive electrical specialties, such as ammeters, cut-outs, parking lamps, etc., for both manufacturers' equipment and the jobbing trade.

## Strictly Business Sessions for N. A. M. T. S. M. Meeting

A number of potent questions are to form the material for discussion at the annual meeting of the National Association of Motor Truck Sales Managers, to be held at the Hotel Statler, Detroit, Mich., December 2 and 3. Under the direction of Don F. Whittaker, general manager of the association an important array of speakers has been arranged.

The first day will be devoted entirely to addresses by men of national prominence, who can deliver a message to truck executives and salesmen that will instill confidence and renew efforts for business. The keynote of the meeting will be a New Year's resolution to forget the past and to make 1922 a year of great productivity.

Invitations for addresses have been extended to Charles Schwab; C. E. Steffey, sales manager of the National Cash Register Co.; Hon. Edwin Denby, Secretary of the Navy; Will Hays, Postmaster General; and a number of other men prominent in the industry. In all probability, Alfred Reeves of the N. A. C. C. will speak on general conditions and Harry Moock, of the N. A. D. A. will address the meeting on what the manufacturer should do for the dealer.

At the second day's session, the election of officers along with three directors, to serve for the new year, will be held. The rest of the day will be spent in addresses by motor truck men on conditions in the truck industry, and how they are to be met.

The annual meeting is designated as a "strictly business" meeting. This year's convention is to be stripped entirely of the social aspect.

## California Association Continues Its Good Work

Proceeding with the idea that the banker should be the real ally of the automobile industry, the California Automobile Trade Association, through its secretary-manager, Robert W. Martland, is conducting a series of meetings throughout the state in which bankers, retail distributors and members of every branch of the automotive industry are invited. These meetings are featured by an unusual speaker, whose aim it is to present the importance of the automotive industry to the business world. The campaign is meeting with great success and is strengthening the confidence in the industry, among financial men.

## Goodyear Shows Production Record

Edward G. Wilmer, president of the Goodyear Tire & Rubber Co., states that, notwithstanding the fact that sales during the first six months of 1920 had exceeded those of any period in the company's history, there had been more tires sold during the ten months up to Oct. 1, 1921, than in the same period a year ago. In September this company sold 69,000 more tires than in September a year ago.



# First Annual Tire Gathering Tackles Difficult Problems

**D**ELEGATES to the first annual convention of the National Tire Dealers' Association, held at Cleveland, October 18-20, passed a resolution urging tire manufacturers to discontinue printing of all tire price lists save the one list meant for consumers, giving the retail sales price the car owner is expected to pay.

Speakers proved that practically every confidential dealers' list printed immediately gets into the hands of tire users, with the result that they know the dealer's tire costs and refuse to allow him the legitimate profit he is entitled to.

This was one of many resolutions passed at the meeting, which was attended by nearly 200 delegates, representing the membership of 1,700 tire dealers scattered all over the United States. Other resolutions passed that show the trend of tire dealer thoughts these days were as follows:

Urging tire manufacturers to insist that car manufacturers take only four casings and four tubes for every car they produce, and do not order in addition to this for distribution at ruinous prices among their car dealers for resale. The tire dealers feel that car dealers should not compete with them in this manner.

Asking the manufacturer of tires to absorb the war tax and make it a part of his sale price to the dealer.

Urging dealers to use more care in buying large quantities of tires on trade acceptances with spring datings, and asking manufacturers not to force these large commitments, as they almost invariably lead to a dealer being caught with large stocks when the acceptances fall due, with the result that he sells his tires at any old price to get the money to meet the obligation. Manufacturers were also urged to make the dating on these acceptances fall in summer months instead of spring in those parts of the country where spring comes late.

Asking manufacturers to co-operate with the association in getting their dealers into the organization for the good of the business generally.

Urging manufacturers to do away with mileage guarantee, and if it is still maintained, to allow of adjustments only through recognized dealers of each make and on the basis of the cost of the tire to the dealer.

Asking manufacturers to eliminate the practice of selling direct to so-called "national accounts," as these accounts usually meant the furnishing of tires to employees and friends' cars also. The association asked that these accounts be handled through recognized dealers.

Asking manufacturers to stop the practice of letting seconds accumulate at the factory until they could be sold as a job lot, and suggesting that the regular dealers of a company would always be willing

to take at least 2 per cent of their commitments in these seconds. This would tend to eliminate "gyp" handling of seconds with all the evils that come with that type of dealer.

Urging all tire dealers to work for the passage of fraudulent advertising laws, such as Cleveland now has, that hold "gyp" dealers to truths in their advertising statements.

Urging co-operative advertising on the part of dealers in local associations.

Urging tire manufacturers to adopt such dealer policy as would allow their dealers to maintain their business ideals and sell without the illegitimate competition that results from the present dealer policy of some of the manufacturers. Each manufacturer will be asked to give the associations its definite policy as regards its dealer attitude. The resolution states that it is "humanly impossible to merchandise tires properly under the present policy of some manufacturers."

## Valentine Elected President

R. F. Valentine, of Cleveland, who has been vice-president since the association was formed last winter, was unanimously elected president after Frank Zeman, president of the Chicago Tire Dealers' Association, and R. J. Walters, of Baltimore, withdrew from what promised to be a spirited election.

Mr. Zeman was then named vice-president, and H. O. Stenzel, of Milwaukee, was re-elected treasurer. Philip O. Deitsch, of Cleveland, was retained as secretary, and the offices of the association will continue at 642 Engineers Bldg., Cleveland.

Thomas Whitehead, of Chicago, retiring president, was elected to the board, as was E. P. Farley, of Minneapolis, who succeeds himself. The rest of the board consists of R. R. Wooley, of Cincinnati; H. O. Stenzel, of Milwaukee; R. J. Walters, of Baltimore, and E. J. Methudy, of St. Louis.

George K. Culp was allowed the privilege of the floor to explain that the "Culp plan" tire dealers were honest merchandisers and should be allowed to come into the association and pledged his support in getting them in.

## Budget for Next Year

The association budget for next year calls for the expenditure of \$11,000. This will be met by dues and subscriptions from members and locals.

The sum of \$2,548 was raised by subscription at the meeting to cover the deficit accumulated during the year.

Delegates were present at the meeting from Akron, Chattanooga, Cedar Rapids, Chicago, Decatur, Alabama, Evansville, Ind.; Grand Rapids, Mich.; Memphis, Minneapolis, Oshkosh, Peru, Ind.; Wilmington, Del.; Houston, Baltimore, Louisville, Cincinnati, Ft. Wayne, Valparaiso, Cleveland and Little Rock.

There is a real place for the national association and under the very able leadership of Mr. Valentine there is every reason to believe that it will grow and be a real factor in bringing about better merchandising methods during the coming year.

The members spent an entire day during the Cleveland convention visiting the tire plants at Akron and Kent and the social events planned by the Cleveland local made the evenings very enjoyable.

William McNeill, president of the General Tire Co., made a splendid merchandising talk at the first evening session.

## Gary Trucks to be Made in Canada

A company called the Gary Motor Truck Corp., of Canada, Ltd., has been incorporated with a capital of \$4,500,000, to manufacture Gary motor trucks. The company has purchased the Chase Tractor plant on Atlanta Ave., Toronto, Canada, which contains 75,000 sq. ft. of floor space.

The president and general manager is Theodore B. W. Zumstein, who has been vice-president of the American Gary Co. The sales department is under A. S. Holleyhead, who is also director of the company. The board of directors is made up of some of the leading financial men of Canada: R. J. Cluff, Hon. Senator Curry, Roy M. Wolvin, W. J. Cluff, and Jas. Whelan.

The company will immediately begin manufacturing as many parts of the different units as is possible in Canada. The plant is ideally situated in the heart of Toronto and shipping facilities are both by rail and water. All export business to foreign countries will be taken care of by the Toronto factory.

The firm will go after municipal business and will produce fire apparatus, special bus jobs, street flushers, etc.

## Piston Company Increases Distributing Centers

To more effectively distribute its products, the DeLuxe pistons, the Clark-Turner Piston Co., of Los Angeles, Calif., has established a number of factory branches in the important distributing centers. Those so far appointed are: the Kansas City Motor Parts Co., 1506 McGee St., Kansas City, Mo.; Bentley and Diehl Bros., 114 S. Van Buren Ave., Freeport, Ill., and the Westervelt Machine Corp., 921 8th St., New York City. These companies will carry warehouse stock of about 30,000 pistons each.

## Pierce-Arrow Working Full Time

An announcement comes from the Pierce-Arrow Motor Car Co., of Buffalo, N. Y., that production and sales of the company has reached a schedule which is rapidly approaching normal. As a result the factory is working full time, with a force of 4230 workers.

# NEW COMMERCIAL CARS



## Avery Country and City Speed-Truck

**T**HE new six-cylinder Avery recently announced by the Avery Co., of Peoria, Ill., is especially adaptable to both country and city hauling. Equipped with pneumatic all-weather cord tires, and six-cylinder engine, this new job is described as effectually combining power, speed and ability for doing the work required of it.

In its construction every piece of material and unit is stated to have been standardized and carefully tested. Raw materials are tested and analyzed and tested before being used; parts are inspected—then the assembled units are inspected and tested; and lastly the completely assembled truck is given a road test and final inspection before shipment. In all these tests a pay-load of 1¼ tons capacity is hauled.

This truck is sold chassis only, chassis with all-weather cab including seat, or complete with all-weather cab and a choice of three bodies—box body for hauling grain, for which a hog or stock rack may be furnished and a stake body.

The engine is of a powerful six-cylinder design with large crankshaft and heavy drop-forged connecting rods. This engine was chosen because of three important advantages believed to be derived from this type of engine, namely, exceptional flexibility, perfect balance and uniform torque. The cylinders are cast in block with removable cylinder head; bore and stroke is 3 in. x 4 in., respectively. N. A. C. C. gives it a horsepower rating of 21.6. Speed is 1400 r.p.m. A centrifugal governor of the throttle type, entirely enclosed and operating in a spray of oil, controls the engine speed.

Lubrication is through the force feed and splash system and pump. A float type of indicator shows the oil level at all times.

Ignition is by a high tension K-W magneto, equipped with an impulse starter. The fuel system consists of a 14-gal. tank located under the seat, Stewart vacuum tank mounted on the dash under the hood, and a Stromberg carburetor. Fuel economy is afforded through the use of a hot-air arrangement. The fuel supply may be manual or governor controlled by reason of a special fuel governing device.

The cooling system combines air and water circulation, as the engine is equipped with a belt-drive, four-blade fan and thermo-syphon system with a large cellular type radiator. The capacity is approximately 8 gal. The radiator is also protected by a pressed steel bumper.

The engine clutch and transmission are mounted in unit. The clutch is of the dry-plate, multiple disk type and the transmission is of the selective sliding gear type, providing three speeds forward and one reverse. High speed is on direct drive. A power take-off from the gear-case is also provided.

Believing road shock to be better diffused through springs, the Hotchkiss type of drive was decided upon and is being used. Final drive is through a Torbensen internal-gear rear axle provided with a Powerlock differential. The front axle is of the inverted Lemoine type. It is a drop-forged I-beam section, heat treated.

A pressed steel frame, 5-in. channel section, with 2-in. flange, is used. It has three cross-members and bumper in front. Riveted to the frame are the step-hangers, brake rod shaft brackets, rear springs and tail lamp brackets. Both front and rear springs are chrome vanadium steel, heat-treated. Rubber bumpers are also provided, so as to take the brunt of shock from the springs when traveling over rough roads.

The rear wheels are provided with two sets of brakes. The service brake is external contracting and foot operated. The emergency brake is internal expanding and hand lever operated. A Ross steering gear is used in connection with the front wheels. Drive is left hand with gear change and emergency brake lever located in center at the right of the driver.

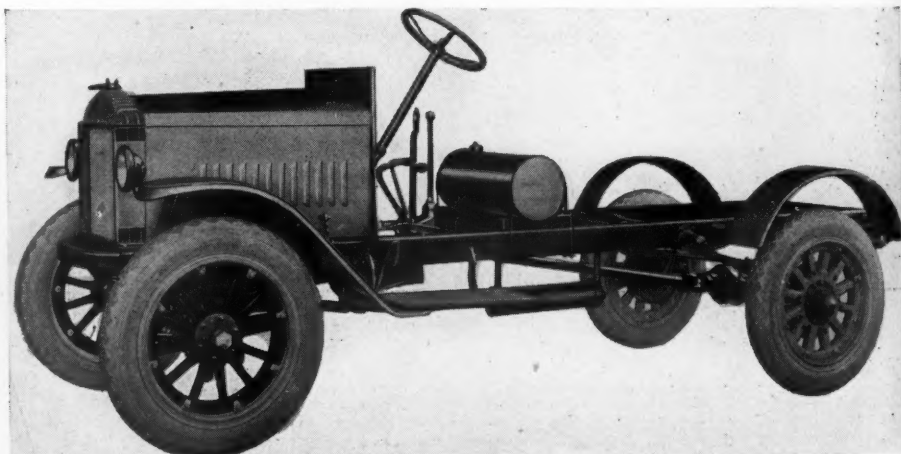
Artillery type wood wheels with roller bearings both front and rear are used. They are fitted with Goodyear demountable rims and carry Goodyear 34 x 5-in. all-weather tread pneumatic cord tires.

This truck is regularly equipped with pneumatics, Alemite lubricating system, tool kit, hand pump, Westinghouse 2-unit starter and generator, Willard storage battery, Klaxon horn, double bulb head lamps, tail lamp with license bracket, dash light and one extra demountable rim.

### Hawkeye Announces New Speed Job

In keeping with the progress and tendency of motor truck manufacture of the day, the Hawkeye Truck Co., Sioux City, Iowa, just announced its latest model, a one-ton speed truck. It is essentially an assembled proposition containing the following well known units and features of construction:

Buda engine, with a bore and stroke of 3½ in. x 5½ in., respectively; full force oiling system; ignition by magneto; electric lights and starting; Fuller transmission, providing three speeds forward and one reverse; Clark bevel-gear rear axle, having a final gear reduction of 6 to 1; Zenith carburetor; cast radiator shell with tubular core; and disk wheels equipped with 35 x 5 pneumatics. This 136-in. wheelbase job has a rated road speed of 35 m.p.h.



New Six-Cylinder Avery Recently Announced by the Avery Co., Peoria, Ill. It is Adaptable for Urban and Rural Quick Delivery Hauling



## Kearns-Dughie Announces Model H Speedy Truck

**T**HE Speedy Truck manufactured by the Kearns-Dughie Motors Corp., Danville, Pa., is described not only containing well known units of quality reputation, but that it is essentially a scientific assemblage of these units. Proper disposition and balance of each component also was given thorough consideration in the designing of this chassis.

Model H, by which this new speed job is known, is of 2000 lb. capacity and is listed at \$1600. Complete with express body as shown in the accompanying illustration the list price is \$1825 f.o.b. Danville.

The engine is a four cylinder Herschell Spillman with a bore and stroke of  $3\frac{1}{2}$  x 5 in., respectively. The thermo-syphon system of cooling is employed. Ignition is by a Berling high tension magneto, and carburetion is through a Zenith carburetor.

From the transmission the power is carried through a Borg & Beck, dry-disk clutch to a Grant-Lees sliding gear transmission providing three speeds forward and one reverse. The engine, clutch and transmission are mounted in unit. The propeller shaft is of tubular steel and of double joint assembly. Drive is Hotchkiss. Final drive is through a Torbensen internal-gear rear-axle equipped with a Powerlock differential. Timken bearings are used throughout.

The front axle is a drop forging of the conventional I-beam section.

The steering gear is of the irreversible screw and nut type mounted for right or left steering.

The frame which is of special heat treated pressed steel, measuring 4 in. x 2 in. x 3-16 in., is suspended on four carbon steel, oil tempered, semi-elliptic springs. The front springs are 2 in. wide x 36 in. long, and the rear springs are 2 in. wide x 50 in. long.

Both integral and external brakes are

provided for emergency and service braking. They actuate on drums, 2 in. wide x 14 in. in diameter.

Wood artillery type wheels having  $1\frac{3}{4}$  in. hickory spokes, front and rear, are

used. They are equipped with 32 in. x  $4\frac{1}{2}$  in. pneumatic throughout.

Overall length is 180 in.; width, 34 in.; distance from back of seat, 90 in.; wheelbase, 118 in.; tread, 56 in.

Standard equipment includes hood fenders and side dust shields, 2 head and 1 tail electric lamps, Dyneto two-unit system starter with Bendix drive, electric horn, gasoline tank, storage battery and tools.

## Three-Quarter Ton Rowe Speed Truck

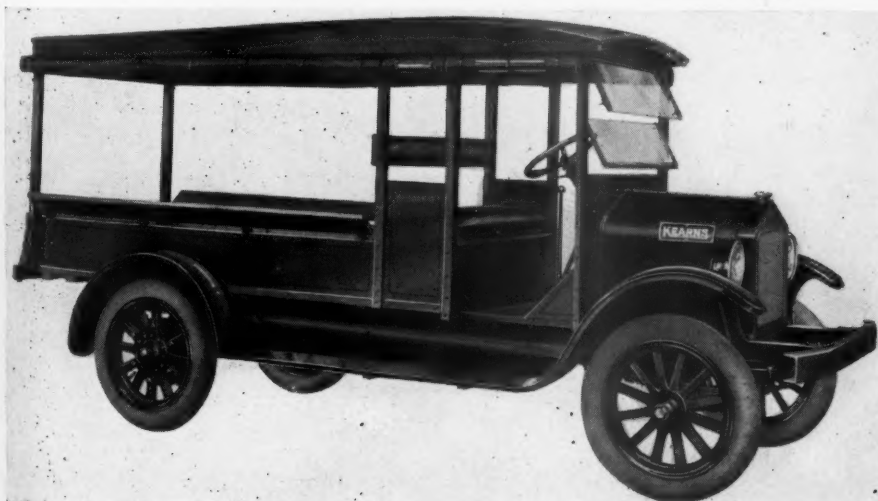
**C**OMMENDABLE performance, both in economical operation and satisfactory service, of the units in the various models of Rowe trucks explain why the Rowe Motor Manufacturing Co., Lancaster, Pa., decided to incorporate practically all of the same make units in its new  $\frac{3}{4}$ -ton speed

job, which was recently announced. Among the units used in Rowe models are: Sheldon worm-drive axle, Wisconsin engine, Brown-Lipe transmission, Spicer universal joints, Bosch magneto, Zenith carburetor, Gemmer steering gear and Rowe channel section frame.

The price of the new speed job chassis



New Rowe Speed Truck is Assembled of Well-Known Units



Model H Kearns-Dughie Speed Truck Complete With Express Body  
List Price, \$1825 f.o.b. Danville, Pa.

equipped with pneumatic tires is \$2400. Standard equipment includes driver's seat, two side oil lamps, one oil tail lamp, two Prest-O-Lite gas head lamps and tank, tool kit, vibration horn, Bonnet wrench and jack.

The engine, which is rated at 22.5 hp., S. A. E. rating, is cast in block and has a bore and stroke  $3\frac{3}{4}$  in. x 4 in., respectively. The maximum running speed of the job is 30 m.p.h. Lubrication is by gear pump, driven by camshaft and accessibly mounted on the side of the engine. The cooling system includes a radiator of large capacity. Circulation is by water pump. Ignition is furnished by an Eisemann magneto generator and carburetion is through a Zenith supplied by gravity from a 15-gal. gasoline tank located under the seat.

From the engine the power is transmitted through a multiple-disk type clutch of special design to a sliding gear

transmission providing three speeds forward and one reverse. Final drive is through a worm gear rear axle. Brown worm gear. The worm is of special heat treated steel, and the differential gears of hardened steel. Roller and ball bearings are used throughout. The ratio is 5 to 1.

Drive is from the left with the control levers in the center, the latter being mounted directly on the transmission case. The gear shift lever has positive locks for each of three gear positions. The spark and throttle levers are mounted directly on the steering wheel.

The frame, which is of exclusive Rowe design and constructed of high carbon

steel, is suspended on four semi-elliptic springs so underslung as to minimize road shocks. The rear springs measure  $2\frac{1}{2}$  in. x 50 in. and the front  $2\frac{1}{4}$  in. x 41 in.

Steering is through a gear of the irreversible worm and nut type, operated by an 18-in. wheel so mounted as to afford the driver complete comfort.

The second growth hickory artillery wheels are equipped with 34 x 5 pneumatics, front and rear.

The wheelbase is 122 in.; tread, 56 in.; length of frame front back of seat, 97 in.; from ground line to top of frame,  $31\frac{1}{8}$  in., and length overall,  $181\frac{1}{2}$  in.

transmission providing three speeds forward and one reverse. From the transmission the power is carried back to the rear axle through a one piece, tubular shaft  $2\frac{1}{2}$  in. in diam. with a 3-16 in. wall.

Final drive is through a straight bevel gear, of the latest live axle type. This axle is said to afford ample reduction for truck requirements. Driving torque is effectually taken and absorbed by the Hotchkiss type of drive. Two sets of brakes are provided on the rear axle; service, which is internal contracting, and emergency, which is internal expanding. The front axle is of the conventional I beam section, drop forging.

Springs are semi-elliptic, 44 x  $2\frac{1}{2}$  in. front, and 48 x  $2\frac{1}{2}$  in. rear. Cord tires, 35 x 5 both front and rear, are used on the heavy-duty wood artillery wheels.

Controls consist of and are arranged as follows: Steering on left, gear shift and hand brake lever in the center, foot accelerator, spark and throttle control on steering wheel.

The weight is 2840 lb.; body allowance, 800 lb.; wheelbase, 130 in.; tread, 56 in.; length back of driver's seat, 98 in., and distribution of weight, front, 1665 lb.; rear, 1175 lb.

The standard equipment includes electric head and tail lamps, electric horn, generator and storage battery, Motometer, bumper, high pressure grease gun, tool kit, hand pump and jack.

The price is \$1625 f.o.b. Detroit.

## Denby Three-Quarter to One and a Quarter Ton Speed Truck

THE Denby Motor Truck Co., of Detroit, Mich., is again bringing its  $\frac{3}{4}$ - to  $1\frac{1}{4}$ -ton speedster before the attention of the trade, makes the statement that after considerable investigation as to the exact prerequisites in construction and design essential to the maximum speed truck performance, a few revisions in the nature of improvements have been incorporated in this model. The job as it stands now is the final outcome of extensive tests and research, which were governed by three important issues, namely, the securing of a large factor of safety, the securing of flexibility in traffic, and the securing of quick "get-away." This speed truck is stated to attain a road speed of 35 m.p.h. and more.

A slight change in the frame represents one of the improvements, it being finally decided to use a 4 7-16 in. deep, 3 in. wide and 3-16 in. thick pressed steel frame strongly braced with cross members and gusset plates.

The engine is a four cylinder, cast-in-block, removable-head, overhead-valve

type suspended from three points and mounted in unit with the clutch and gear-set. The bore and stroke is  $3\frac{1}{2}$  in. x 5 in., respectively. The extra large crankshaft, which is of special alloy of 90,000 lb. per sq. in. tensile strength, rotates in three liberal sized bearings. The connecting rod bearings are also of ample size. Lubrication is force feed with splash plunger pump. At normal speed the engine is rated at 32 5-10 hp. The S. A. E. rating is 22 5-10 hp.

Gas is fed to the engine through a 1-in. carburetor equipped with a hot spot manifold device. Ignition is accomplished by a high tension, waterproof magneto. The thermo syphon system of cooling is employed. The water is circulated through ample sized water jackets and cooled quickly by an extra large radiator of the built-up type, the top and bottom tanks of which are cast. Cooling is further assisted by a large 16-in. fan mounted on annular ball bearings.

From the engine the power is transmitted through a multiple-disk, dry-plate clutch enclosed against dirt, to a selective

## A Rubber-Tired Steam Shovel

The Osgood Co., Marion, O., recently completed a  $\frac{3}{4}$  yd. traction revolving steam shovel, known as the Osgood 18, and equipped with solid rubber tires manufactured by the Firestone Tire & Rubber Co.

This shovel will be of special interest to contractors or others who have jobs in the cities or elsewhere which require frequent moves over paved streets or highways without injury to the thoroughfares. This information should be of value to the truck salesman cultivating a contractor prospect as an interesting bit of data for incorporation into his sales talk.

The tires are 40 in. diam. by 14 in. wide, ribbed tread, mounted on steel rims. They are pressed on the regular 34 in. diam. 16 in. face cast steel wheels, which arrangement permits the removal of the tires when desired, and by attaching the cleats to the rear wheels is then ready for service where it is not desirable to use rubber tires.

This outfit, so designed and mounted, eliminates the damaging of thoroughfares, permits movement from one location to another with ease, decreases disturbance and delays along the route, whether towed or moving under its own power, permits them to be moved at an astonishing rate of speed and eliminates the vibration usually experienced when running on steel wheels.

The number of passenger cars and trucks in use in the Prairie Province, Canada, has increased during the year by 11,283.



This Denby Speedster Equipped With Express Body is Capable of Attaining a Road Speed of 35 m.p.h.



## Watson Model B Speed Truck

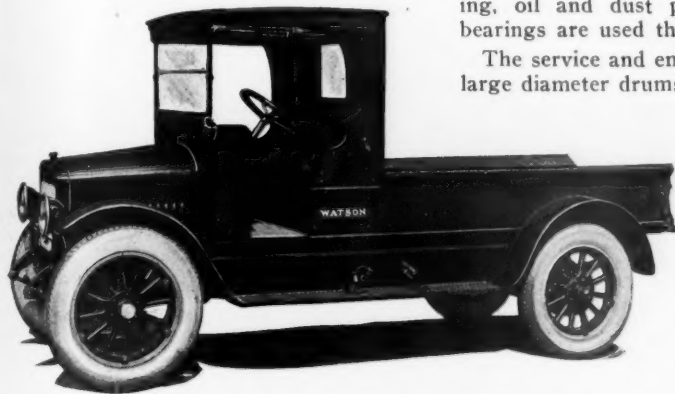
**T**HE one-ton Watson speed-truck manufactured by the Watson Products Corp., Canastota, N. Y., is well adapted to light and medium-sized hauling and delivery jobs of city and country. It is ruggedly constructed and is pointed out to maintain a speed of from 25 to 30 m.p.h. even with an additional reverse load over capacity load.

The four-cylinder, removable, L-head

and one reverse, mounted in unit with the engine and clutch. A port hole is provided in the case of the transmission for the mounting of a power tire pump. Drive is carried from the transmission to the rear axle through a tubular shaft equipped with two universal joints, which are extra large, dust proof, easily lubricated, and of the journal and pin type.

The rear-axle is of the worm and worm gear type, having a two-piece steel housing, oil and dust proof. Annular ball bearings are used throughout.

The service and emergency brakes have large diameter drums and are both of the



Watson for  
Light City and  
Country Speed  
Delivery.

type engine is of heavy-duty design, and has a bore and stroke of  $3\frac{3}{4}$  in. x  $5\frac{1}{4}$  in., respectively. The crank and camshafts are drop forgings, with the cams on camshaft forged integral. Engine speed is controlled by a positive acting governor. The engine is suspended from three points. Lubrication is splash and force feed. Lubricant is constantly filtered and strained before re-entering pump. Fuel is fed by gravity from the cowl tank to carburetor. Gas economy is stated to be effected by reason of a hot-air jacket which surrounds the mixing chamber of the carburetor. Ignition is by a Connecticut distributor mounted on the generator. An automatic switch prevents short circuiting if switch is left on when the engine is not running.

Cooling is through pump circulation, including a cellular single tank type radiator in its system. Cooling is further aided by a four-blade belt-driven fan, running on two annular ball bearings.

Power is transmitted from the engine through a Brown & Lipe multiple-disk, dry-plate clutch to a Brown & Lipe transmission, providing three speeds forward

internal expanding type. The Parish open hearth, pressed steel frame is supported by four semi-elliptic specially treated car-

bon steel springs, having easily replaceable bronze bushings. All the spring bolts are fitted with oil reservoirs and wicks. The front springs measure  $2\frac{1}{4}$  in. x 40 in.; and the rear,  $2\frac{1}{4}$  in. x 50 in.

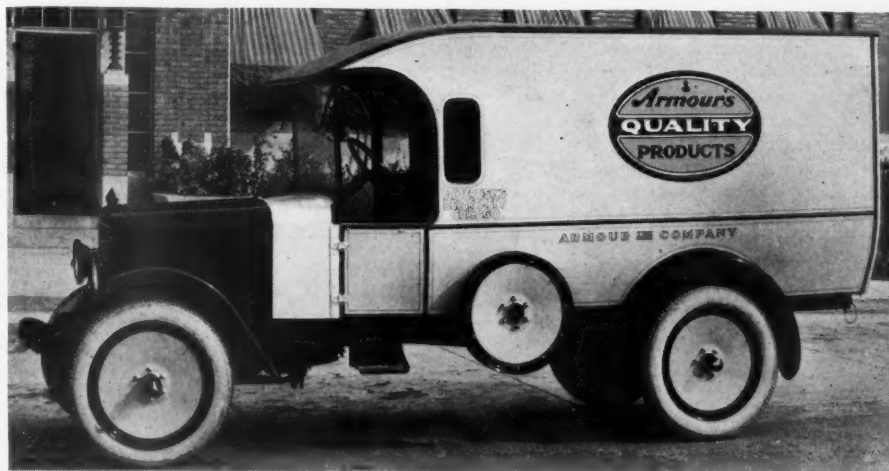
The wheels, which are wood, of second growth hickory, are fitted with heavy-duty demountable rims and 35 x 5-in. cord tires with non-skids in the rear.

The steering gear is of the worm and split head type and is mounted on the left hand side of the driver's cab. Spark and throttle levers are mounted on the steering wheel. A foot accelerator is also provided on the toe board. Mounted on the instrument board within easy reach of the operator are ignition and lighting switch, ammeter, speedometer and carburetor dash control.

This Watson model has a 128-in. wheelbase and 56-in. tread both front and rear.

The standard equipment includes Dyneto generator and starting motor, Exide battery, electric head lights with dimming switch, electric tail light, electric horn, one extra demountable rim, speedometer, jack, tire pump and full kit of tools.

An indebtedness of \$2,000,000 has been wiped out by the General Tire and Rubber Co., while the India Tire and Rubber Co. officials report collections better than for two years, with production better than last year.



### A Speed Job That Will Make You Stop and Look

The advertising department of Armour & Company is truly an advertising department, for when it requisitioned for a quick delivery truck specific specifications calling for an attention-attracting body were made, and the above is the result. This body is mounted on a Model 15 Service speed truck, built by the Service Motor Truck Co., Wabash, Indiana.



Showing the Three Types of Cab and Body Equipment Furnished for the Kissel Express  
by the Kissel Motor Car Co., Hartford, Wis.

The left-hand view shows the standard Kissel chassis and body completely equipped with electric lighting and starter, express type body and top, cord tires and painted complete. This particular job is listed at \$1985. The other two views show one chassis equipped with a special body for long distance hauling and another with a flareboard body with a Kissel all-year cab, the upper half of which is demountable for summer use.

## Mulholland Universal Steel-Lined Dump Body

**A** STEEL lined dump-body constructed to withstand the severe service subjected to bodies of this type in construction work, and equipped with a double-acting tail-gate and removable sides was recently announced as an addition to the extensive line of the Mulholland Co., Dunkirk, N. Y.

The platform of this body is built with heavy sills, which are gabled out to take special taper pockets, permitting the rapid and easy removal of side panels. The platform is lined with 10-gage steel, bound entirely around with 2 1/4 in. x 5-16 in. steel.

Two sections make up the side paneling. The lower panels are constructed with heavy stakes and top rails and the upper panel is of steel and is attached

on to the lower panel when it is desired to prepare the body for the hauling of coal, coke, ashes and other similar bulky material. In order to permit the use of other Mulholland standardized upper body types the stake pockets on the new job were arranged in conformity with the spacing on the other regular standardized bodies.

Rapid convertibility from a dump body to one adapted to carrying package or household goods is the feature especially emphasized by the manufacturer. The fact that the owner is enabled to operate his truck all the year around on all classes of merchandise is also pointed out.

On construction or road work by reason of the removable sides this steel lined dump body permits easy loading of cement, brick, lumber, reinforcing steel,

etc., on the platform instead of lifting it over the side.

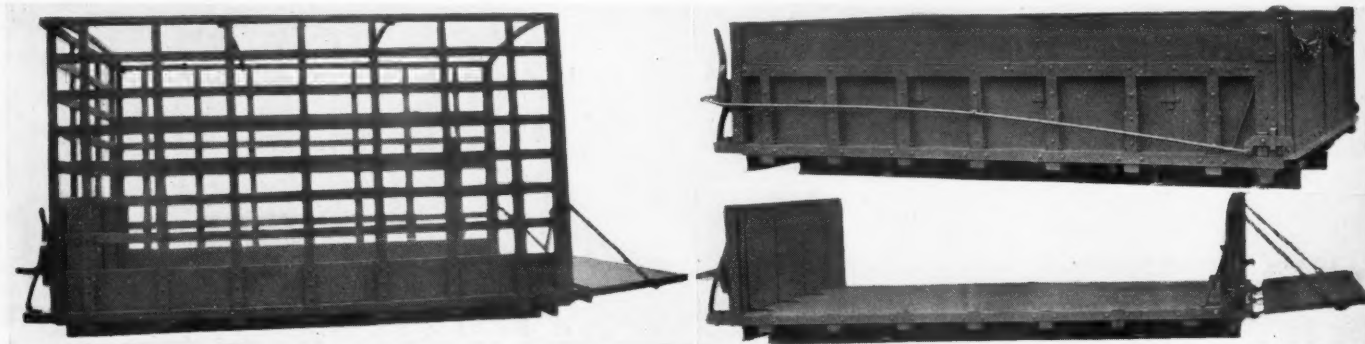
This body is built in three sizes, having a normal capacity of 2, 3 and 4 yards, respectively. These capacities may be extended in each instance through the use of auxiliary side-boards. The capacities given are based on a water-level, and where a rounding load is carried, the capacity can be increased from 15 to 20 per cent.

### Wichita Shows Sales Improvement

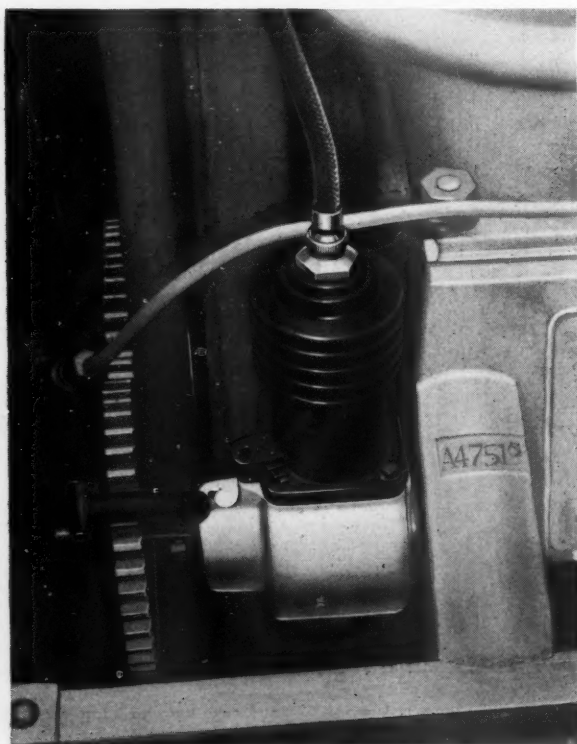
A decided improvement in business during the last three months is reported by the Wichita Motors Co., of Wichita Falls, Tex.

The company attributes this advance in business to the rapid strides taken by oil operators in the Southwest as well as price advances in cotton and rice.

The export trade of the Wichita Motors Co., is also showing an improvement, especially during the last thirty days.

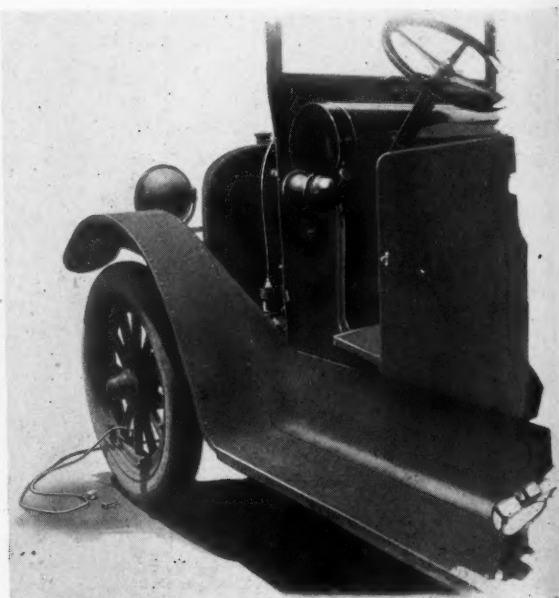


Showing Three of Five Conversions Possible With the Mulholland Universal Steel-Lined Dump Body  
First view shows the rack and bow assembly; second, the double-acting tail-gate, side, and auxiliary side assembly; third, removed side assembly with end-posts in place



### Views Showing the Installation of a Kellogg Model 201 Engine-Driven Pump on Present Models of Reo Speed Trucks

This pump is driven by a gear attached to the fan pulley on the crank shaft of the engine. The pump is bolted solidly to the front end of the engine and is put into operation by shifting into mesh position, the gear on the pump with the stationary gear bolted to the fan pulley of the engine. A sufficiently long hose equipped with a 200 lb. gage, and a quick-acting thumb-lock connection, comes as part of the equipment. A number of other trucks, among them being Commerce, Stewart, Brockway, Clydesdale, G.M.C., Federal, Graham, and Oldsmobile, are equipped with transmissions having openings over which the different models of Kellogg pumps are designed. The manufacturer is Kellogg Mfg. Co., Rochester, N. Y.





## Whitfield Offers Four Models of Bus Bodies

**A**MPLE seating capacity, modern appointments, attractive appearance, both interior and exterior, passenger comfort, and special constructional features briefly describes the line of bus bodies now being offered by the W. H. Whitfield & Son, Penn Yan, N. Y. They are built in 20-, 24-, 28- and 32-passenger capacities, adaptable to any make truck of 1½, 2 or 2½ ton capacity.

The frame-work in all four models is of a light but rigid construction. An exclusive feature of design in the frame-work is a bridged-truss construction in which the weight of the post and sill is hung to the cross-bars. This method of construction, it is said, not only produces a strong and light frame but conceals the ends of the cross members as well. The swell-side panels are of heavy gage auto steel set off by neat moldings.

White ash bows bent to form, support the light-wood, black-oiled-duck top. A twenty-inch front extension of the top provides protection for the windshield against the elements.

Being an all-weather bus body, the windows, which are large and clear visioned, may be raised or lowered, according to the dictates of the season. Rattling has been avoided by special anti-rattle methods and devices, which incidentally, protect the glass against breakage as well.

Entrance is gained through a specially designed vestibule at the right front end of the body where it is under complete control of the driver while at his seat. Elimination of the conventional door-operating arrangement and folding steps with their resultant clatter is said to have been accomplished in the vestibule

type of entrance. It is further stated that this construction produces increased seating capacity without increasing floor area; also, that no part of the entrance mechanism protrudes beyond the side of the body. For emergency, a door, inconspicuously located at the rear, may be used.

Consideration of passenger comfort was held well in mind in planning the seating arrangement. The seats are wide, roomy, tilted to a comfortable angle, well upholstered and so arranged as to provide sufficient leg-room. They are arranged cross-wise and are 30 in. long, which leaves an aisle 16 in. wide. Seating capacity ranges from 20 to 32 passengers for the various bodies. Push buttons are placed within easy reach of the passen-

The interior is illuminated by four dome

lights, so hinged as to permit ready replacement of bulbs. They are controlled from a mahogany-finished instrument board. Racks for advertising cards are also provided in the sides of the top.

The exterior finish consists of nine coats of paint carefully rubbed and dried before the application of the final coat, which is Valspar varnish. The panels are Napier green set off by black molding, and a cream colored belt circles the entire body just below the window ledge. The belt line is for the accommodation of lettering. The interior is finished in mahogany and furnished with nickel trimmings.

The following are brief specifications of the twenty-passenger bus for a 1½-ton chassis:

Overall length .....	16 ft.
Overall width .....	6 ft., 8 in.
Inside length .....	13 ft., 2 in.
Inside width .....	6 ft., 3½ in.
Inside height (head room)....	5 ft., 10 in.
Weight .....	1750 lb. complete

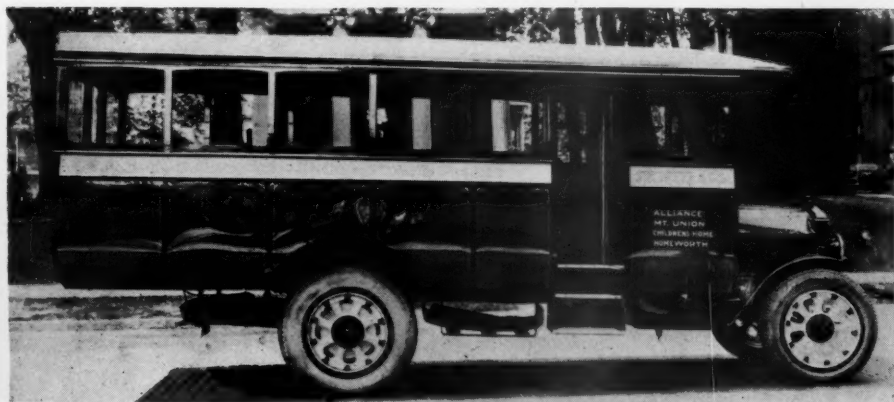
## Combination Cab for Speed Trucks

**T**HE Procter-Keefe Co., 7741 Dix Ave., Detroit, Mich., offers its combination, type B, driver's cab as adaptable to speed truck service, in that its rugged construction not only is capable of withstanding the severe service incident to quick delivery, but that it also presents an attractive appearance and affords the driver protection throughout the year.

The design of this cab is a combination of the sliding curtain and door type cabs. Seasoned hardwood with auto body sheet steel panels make up the construction. The feature of accessibility, through the provision of a cutaway panel is especially emphasized, as it will enable the

driver to enter the cab on the drive side.

Hinged on the side of the cab and toward the rear the doors may be held fully open by a hold-back catch. A ventilating catch, which holds the door open 3 in. is also provided. The curtains, which are of the sliding type, are of rubber curtain material and have large celluloid windows.

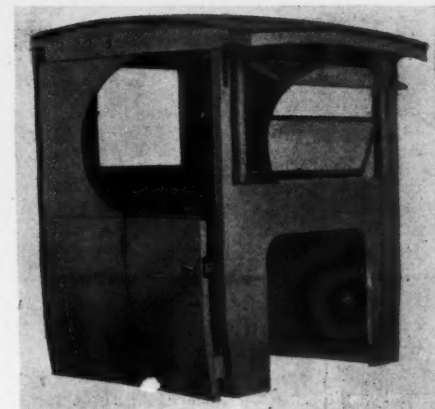
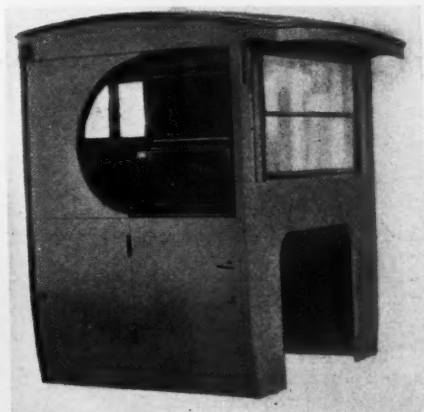


Above: Exterior View of Whitfield's New Bus

Note that the steps do not project beyond side of body and the storm-protected door, which is said to operate perfectly in all weather.



Lower Left: Interior View of Bus Looking Forward, Showing Driver's Position Relative to Vestibule Doors



Showing Open and Closed Appearance of Procter-Keefe All-Weather Cab

Rubber strips are employed around the all-metal construction, full-ventilating type windshield. Heavy plate glass is used.

The rear window is made in two parts and slide side-wise, leaving a clear open-

ing of 17½ in. to 25 in. This opening provides plenty of ventilation. The driver's seat is built right in cab and is comfortably upholstered. A lazyback is also provided. Sufficient space is provided beneath the seat for tools and battery.

It eliminates the paving mixer, with its crew of wheelers and operators, and also the cost of fuel for operating the paver and the expense of moving it on and off the job.

It permits trucks to operate with maximum efficiency. It takes less time to discharge the mixed concrete than to dump two or three batches into the mixer skip. There is no mixer to limit the output.

Greater yardage can be placed. With the truckmixer system, concrete can be mixed in 5 minutes with no additional expense or waste of time.

A dry mixer can be made easily workable by longer mix. This will permit concrete to be mixed with the least amount of water.

The truckmixer system of highway construction has many other advantages, such as eliminating delays due to breakdowns of the paving mixer, and pumping equipment. The fact that all equipment is on wheels makes it easy to transport it to new locations and to keep it under cover at night. In many cases it will reduce the pumping equipment necessary, because water for mixing is hauled in the trucks.

Trucks can be loaded to exact capacity by varying the size of the batch by bags of cement used, instead of hauling a number of batches for the mixer. Stamp truckmixers cost only slightly more than the ordinary dump body and hoist.

All sales representatives, factory and administrative as well as heads of departments of the Madison Tire & Rubber Co., Inc., were in conference at the Iroquois Hotel, Buffalo, N. Y., October 15 to 17. The convention took the form of tire construction demonstrations, instructive speeches and discussions.

Addresses were made by Joe M. Dine, R. E. Haley, August Loos, A. C. Morgan, H. Tyler Kay, and R. A. Low.

## A New Road-Building Outfit

**T**HE Stamp truckmixer manufactured by the Truckmixer Co., Milwaukee, Wis., is a concrete mixer mounted on a motor truck chassis in place of the truck body. The ordinary batch body with its hoist is replaced with a specially constructed frame which fas-

operations where mixed material can be delivered ready for the forms, thereby eliminating all rehandling and necessity for a mixer on the job.

The following are some of the outstanding advantages of the truckmixer system of building roads:

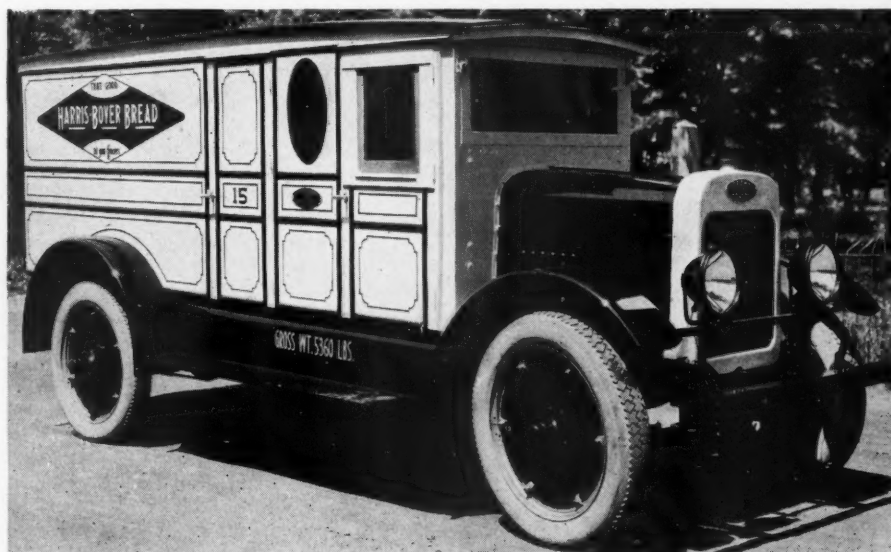


The Truckmixer Consists of a Specially Constructed Frame Supporting a Rotably Mounted Concrete Mixing Drum. Power is Taken From the Transmission Through a Power Take-Off

tens on to the chassis and supports a rotably mounted concrete mixing drum. Power to operate drum is derived from truck motor through a power take-off.

The truckmixer with its mechanism, has fewer parts than the ordinary dump body and hydraulic hoist. Stone, sand, and water are put into the drum from measuring bins, and the required amount of cement is added at the cement shed or car. Mixing is preferably done on the final stretch, just before discharging, but the drum can be rotated at any truck speed, either forward or reverse or when standing still. When it arrives at the place of laying the concrete, the truck is turned around and backed up. The mixer batch is discharged by gravity into a chute which delivers the material to the rear of the truck, and as it moves forward, the chute spreads the concrete so that only a minimum of hand spreading is necessary.

The drum holds and mixes the same amount of material as that held by the dump bodies. This new hauling and mixing method reduces concreting to nothing more than a hauling and finishing operation and while finding its greatest application on road and street construction, will also find a big field in small building



The Baker Figures Prominently as a Speed Job Prospect

The baker, in order to reach and retain quality trade, demands certain special features in body construction in addition to the speed factor of the truck. The illustration shows a special bakery-type body recently installed by the Gramm-Bernstein Motor Truck Co., Lima, Ohio, on its speed truck. In it many new and novel features of construction have been introduced. The doors to the pie compartment are outside instead of in the back of the driver. There is a solid partition in back of the driver's seat to protect baked goods from dust and dirt. Drop sash windows are provided in the cab doors and the extra carrier is under the rear end of the frame.



# TRUCK EQUIPMENT AND APPLIANCES



## Parker Axle for Speed Trucks

**I**N considering the Parker Axle for Speed Wagons, the design indicates an axle largely conventional in the construction of the pressed steel housing, in its three-quarter floating shaft and wheel mounting and in the arrangement of its third member parts. A marked departure, however, has been made in the selection and application of its brake equipment.

In undertaking the development of a speed truck axle, Parker Axles, Inc., 1819 Broadway, New York City, has emphasized the need of a strong, dependable, and easily adjustable brake, capable of meeting the severe conditions of load and speed encountered in express delivery service. The new brake is a modification of the multi-disk clutch made effective as a brake by reason of its large area, its emersion in a circulating bath of oil, and a simple arrangement of applying equalized pressure to the friction surfaces.

Splined housings, A, are carried at either side of the differential upon the forward carried casting, within which are held a series of steel disks, B, free to slide but held from rotation by their engagement with the housing splines. Moulded asbestos facing is carried upon either side of the steel plates. Alternating with these non-rotatable plates are steel plates, C, having splined engagement with a driving hub, D, which in turn is fitted to an extension of splining at the end of the drive shafts. Both hub and plates, therefore, rotate in unison with the drive shaft. Frictional engagement between the rotating and non-rotating plates produces the required braking effort.

The engagement of brake is accomplished by means of a single pull rod, centrally located and connecting with the toggle cams, E, between the two external brake arms, F. A forward motion of these cams separate these arms, moving the inner arms, G, toward the brake units and bringing the plates into engagement by a pressure plate, H, to which these inner arms are attached. With the cams in their normal position they are retained by a socket, I, preventing any side sway

of the levers and so maintaining equal opening clearance in each brake. With the brakes in operation the cams have left the socket, leaving the system of levers free to swing to either side and so equalize any misadjustment or inequality in the brakes.

It is claimed to be impossible to secure unequal braking effort with the Parker multi-disk brake equipment. The automatic equalization of pressure combined with the uniform operating conditions of the completely enclosed and fully lubricated braking surfaces guarantees equal brakes at all times.

The power of the Parker brake, while largely due to the large number of friction surfaces in engagement, is said to be further multiplied by action of the cam plate, K, which rotates with the brake hub. Upon application of the brake the rotation of this cam plate is retarded by its frictional engagement between the non-rotating fans, L-L, forcing it into engagement with its mating cam, M, which in turn drives it against the friction plates, thus increasing the pressure originally applied with the foot.

The rotating steel plates are assembled in pairs in such manner as to provide for the passage of oil through the brake at all times. Passages conduct the oil to the center of the brake from which position it is thrown through the brake by the centrifugal action of its rotating parts, providing a thorough cooling and lubricating means.

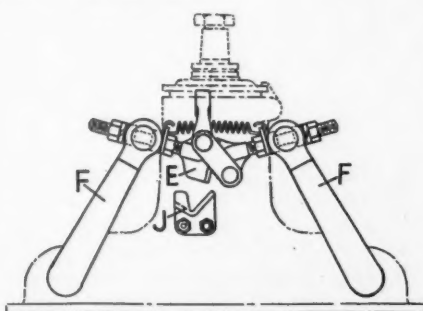
Adjustment of the brake is accomplished by means of the nuts threaded upon the shanks of the toggle cams. The mounting of the brake in no way interferes with the withdrawal of the drive shaft, thus leaving the differential and brake units easily accessible through the front or rear opening of the axle housing.

### Willard All-Rubber Battery Adaptable for Speed Jobs

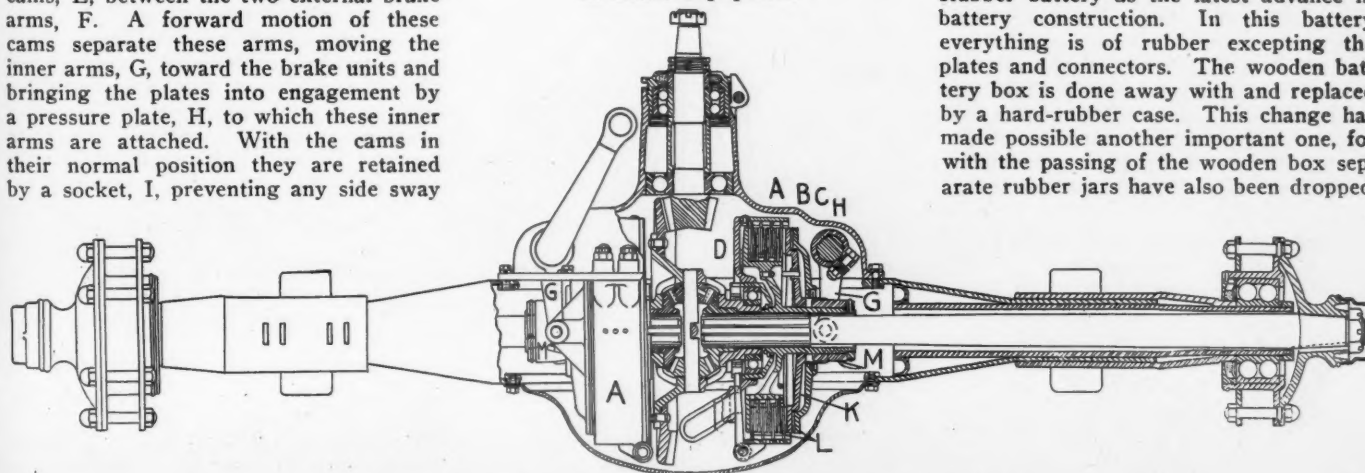
The All-Rubber storage battery, the latest achievement of the Willard Storage Battery Co., Cleveland, O., contains features of special interest to manufacturers and users of light speed trucks. By reason of the features hereinafter described the maker lays claim that this battery will be a great aid toward more economical and speedy transportation, in that it will not only give uninterrupted service but that the various components will have more equal life.

Threaded rubber insulation which made its inception several years ago as a substitute for wood separators, the weakest of the battery, was but a forerunner of the later development, the all-rubber battery.

It is the development of a new case and the bringing together of rubber container and rubber insulators that mark the All-Rubber battery as the latest advance in battery construction. In this battery everything is of rubber excepting the plates and connectors. The wooden battery box is done away with and replaced by a hard-rubber case. This change has made possible another important one, for with the passing of the wooden box separate rubber jars have also been dropped.



Showing New Principle Employed in Brake Equipment



Cutaway and Section of the New Parker Speed Truck Axle



The new container is "Monobloc" construction—that is, the entire piece is pressed into shape at one time under a terrific pressure of several tons to the square inch. This operation produces a container without a single joint, making it a practically indestructible case with self-contained cells. Thus are broken jars eliminated from the schedule of battery troubles.

The battery is stated to withstand both shock and the corrosive effect of the bat-

**Willard "Monobloc" Battery**  
Case and jars are pressed into one integral piece

tery solution. Thus in a truck where an unusual amount of jolting takes place, and where the battery is necessarily subject to rough usage, such as in quick delivery, it has been found that the rubber case will withstand such treatment much longer than a wood case. Also, since rubber is a non-conductor it reduces electrical leakage which is ever likely to be present with acid soaked wooden cases.

The Monobloc rubber container has a tensile strength of 3600 lb. to the sq. in. and must stand 18,000 volt electrical test to demonstrate the absence of cracks or flaws of even the smallest kind. In making this test two wireless transformers capable of sending 1000 miles are used.

## Russel Offers Two Capacities in Speed Axles

**A** NEW 1¼-ton, model 3600-B, bevel-gear axle, intended for high speed truck work, is now being offered by the Russel Motor Axle Company, Detroit, Mich. This axle, stated to have a spring pad capacity of 4600 lb., permits ample overload capacity for a nominal 1¼-ton, pneumatic tire equipped truck.

The brake drums are large, being of 18-in. outside diameter and are fitted with both internal expanding and external contracting brakes. The internal brakes have a 2-in. width, and are toggle operated, making for power, while the external brakes are 3 in. in width. Both the internal and external brakes are of the full-wrapping type.

The housing is of pressed steel, reinforced with a heat treated, chrome nickel tube of 5-16-in. wall, extending from the wheel bearing to within 7 in. of the axle center. In addition to being electric welded, the web in the housing is riveted, and the bolts used to secure the third member extend through and are threaded into the housing. The cover is so designed as to pilot in the housing in a manner similar to that used for third member, giving it a very rigid center construction.

The semi-floating type of axle shaft mounting is used, the outer bearing being

a double row, N. D. No. 311 size. Radax bearings No. 0212 are mounted on the differential, with N. D. No. 1408, single row, and No. 308, double row, ball bearings on the bevel driving pinion. Two gear ratios are obtainable, the 6.33:1, or the 5.33:1. For the former, a 6-tooth pinion, meshing with a 38 tooth gear, while the latter has a 7-tooth pinion, meshing with a 37-tooth gear.

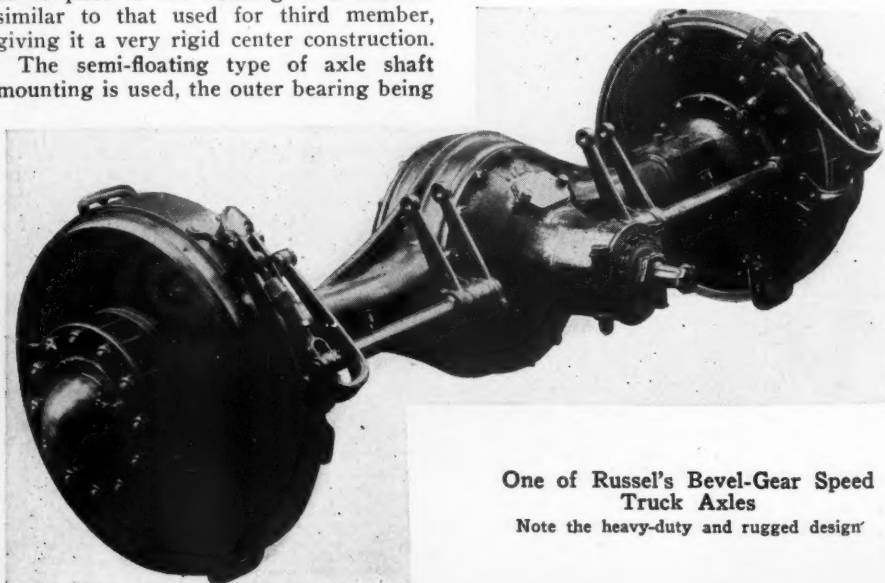
The hubs are mounted upon the axle shafts by means of a taper and a spline.

The regular construction is for wood wheels, but hubs for Distel wheels, or any type of disk wheels can be furnished.

In the ¾-ton bevel-gear axle, the same gear ratios are used, but N. D. No. 310, double row bearings are used for the wheels, and also a smaller differential is used. The axle housing is of the same shape and material, but is reinforced with a chrome nickel tube of 7-32-in. instead of 5-16-in. wall. The brake drums are of 16½-in. outside diameter, with the same type of brakes as used on the larger axle. In appearance, both sizes of bevel gear axles are very similar, the only outstanding difference being in the size of the brake drums. The accompanying illustration is that of the larger axle.

## Salisbury Spiral Bevel-Drive Axle for Speed Jobs

**T**HE spiral bevel type drive rear axle brought out by the Salisbury Axle Co., Jamestown, N. Y., was designed for speed and quick get-away, such as is required in quick delivery service.



**One of Russel's Bevel-Gear Speed Truck Axles**  
Note the heavy-duty and rugged design

Briefly the chief points of design of the Salisbury pressed steel axle follow:

The differential is of the Brown-Lipe spiral bevel type, especially designed with coarse tooth gears. The pinion shaft is integral with the pinion and is made of alloy steel carefully heat treated. The drive shafts are tapered and are made of special chrome nickel steel, heat treated and tested to definite pre-determined standards of strength.

The rear axle is of the three-quarter floating type, possessing the advantages of both ease in removal of shafts and elimination of excess loads on bearings and tubes when rounding curves. This type is also claimed to eliminate danger of shaft fatigue by reversal of stress as shaft rotates.

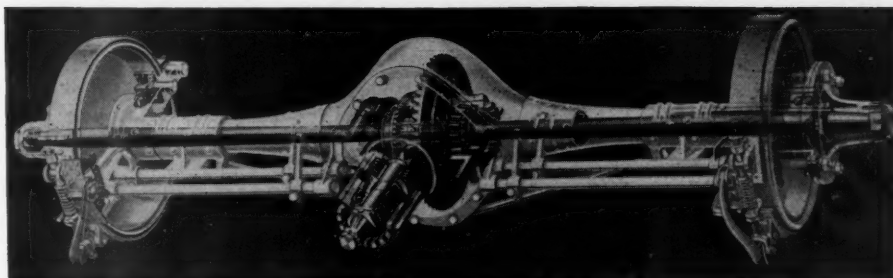
The brakes are unusually large, being 16 in. in diam. and are so designed as to act positively without grabbing, and are equipped with adjustments for taking up wear in the lining.

The axle tubes are extra heavy and are made of seamless steel tubing, pressed on the housing center and securely riveted under very heavy pressure. The drive shafts are accessible by removing eight hexagon nuts on the drive flange, making it possible to withdraw the drive shaft



and flange from the axle without jacking up the wheel, since the full load is carried through heavy roller bearings mounted in the hub. The bearings throughout are amply large to accommodate the various loads and stresses imposed in truck service.

The brake shafts rotate in oilless bushings, eliminating the necessity of crawling under the truck to oil the various parts. The differential gear carrier is readily removable by unscrewing the cap screws which bolt it to the housing.



Special Bevel Salisbury Axle Designed for Quick Delivery Service

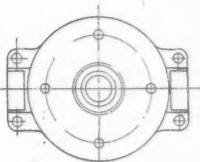
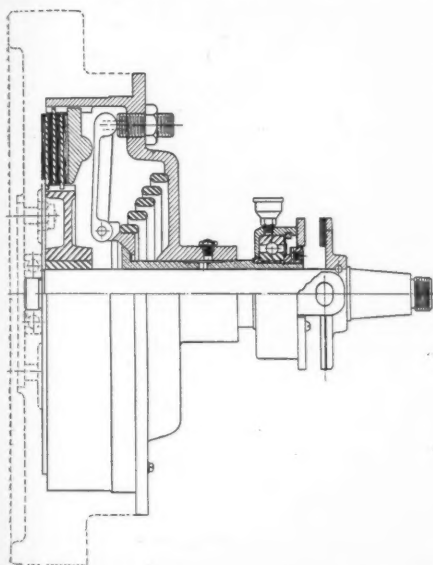
## Hilliard Clutches for Speed Truck Application

**W**ORKING on the knowledge that in speed truck construction engines of greater power than those used in slower speed trucks, where they can use a larger gear ratio, are necessary, a new clutch was developed by the Hilliard Clutch & Machinery Co., Elmira, N. Y. It is specially designed for speed truck service and is known as Model "XDG."

This clutch has a total friction area of 206 sq. in. It will transmit its rated hp. of 35 to 50 hp. at 1000 r.p.m. at a unit pressure of 8.4 lb. per sq. in. when transmitting 35 hp., and a unit pressure of 12 lb. per square in. when transmitting 50 hp. In view of this low unit pressure, infrequent adjustment is said to be the favorable result, and long life of the frictions is assured.

It is claimed to pick up heavy loads smoothly and gradually without chatter and to possess the stamina and endurance necessary for speed truck operation.

In the designing of this clutch the objective aspired to was a clutch that would function continuously through an entire



The Hilliard Company Designed This Clutch Especially for Speed Truck Service.

season without need for frequent adjustment and replacement of frictions. The replacement of new frictions, if required, is but necessary once annually.

The design is simple. A standard 8-pitch tooth is used in the housing and outside driving plate and the same pitch tooth in the two plates which drive to the clutch core and to the shaft. Adjustment is by three screws projecting through the covers, having lock nuts as shown in the illustration, and having guide pins to each side of the lever so as to hold them in their proper position. The inside ends of the levers are attached to a "compensating collar" which has a spherical seat and adequate clearances so that even if one point is adjusted as much as  $\frac{1}{8}$  in. beyond the other two points, the compensating collar is free to change its plane to keep the pressure uniform over the entire friction area.

This same clutch is made up in horsepower as high as 250 at 1000 r.p.m., and is covered by the company's "S" type clutches, which have anywhere from 6 to 12 frictions, depending upon the work to be done. The S-6 and S-8 clutches are used extensively with the Wisconsin  $5\frac{3}{4}$  x 7-in., 4-cylinder engine, and  $3\frac{3}{4}$  x 7-in., 6-cylinder engine.

Heretofore for high power engine jobs in a great many instances a clutch having only two friction linings and a single plate has been used and it has been that the unit pressure on the friction surface was so very high that the life of the friction was very limited and it required frequent adjustment and replacement of the frictions to keep the truck in operation.

In explaining the particular field of service covered by the model "XDG" clutch, the makers point out that in view of sufficient complaint, it has been found desirable to keep within the standard specifications already set by the 2-lining clutch, which means a flywheel having 12-in. diameter counterbore, 2 15-16 in. deep, so that these 2-lining units could be replaced with more powerful and more durable clutches.

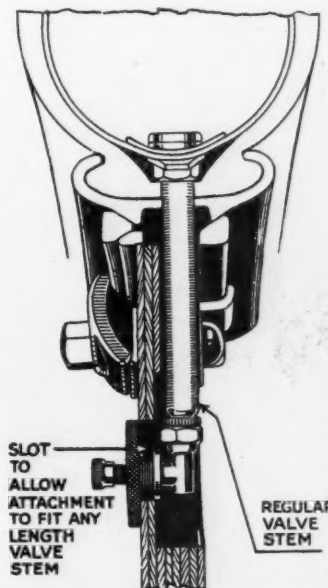
The "XDG" has twice as many friction linings and double the area of one of the clutches not designed for speed purposes.

## Dayton Discwood Wheels for Speed Jobs

Incorporation of Discwood wheels, manufactured by the Dayton Automotive Wheel Co., Dayton, O., in the speed jobs of certain manufacturers, is an indication of approval, founded on satisfactory constructional qualification and adaptability to speed truck service.

The Discwood wheel is made of water-proofed, thin-laminated, rotary-cut, wood sheets, cemented together under pressure with the grain in each lamination running in a direction opposite to the lamination adjoining. This process of construction makes the laminations a strong single unit, which cannot warp or separate by virtue of the grain arrangement and gluing methods employed.

Two important factors in wheel construction are lightness and strength. These are claimed by the makers of the Discwheel. A uniform absorption of road shock and an even distribution of weight throughout the wheel are accredited to the lamination construction. Road shocks are described as following the grain in the various laminations to all points instead of leading directly to the axle. Also, it is pointed out, by reason of the lack of a multiplicity of joints to work loose or break, collapse, rattle or squeak is obviated; the flat surface also eliminates the air resistance of spokes.



Self-Explanatory Section of the Dayton Discwood Wheel

Adoption of this type wheel, together with a special and unique body, has advertising value in that it enhances the attractiveness of a job.

A special point of interest is the accessibility and convenience with which the



Dayton Discwood Wheel for Speed Truck Equipment

tire can be inflated. A patent angle valve attachment is applied to the wheel in such a way that the tire can be inflated from the outside face of the wheel.

The same rims, hubs and parts as used on other wheels, either demountable or clincher rims, or detachable hubs are used.

### Monarch Governor Model G

The Monarch Co., Detroit, Mich., manufacturer of the Monarch, the pioneer gas velocity governor, after an extensive period of original research and scientific experiment, recently announced a new governor, the Monarch Model G, which is now available to the trade.

The work of the Monarch company is based on the hypothesis that the Monarch governor is correct in principle; i. e., the potential force of the moving gas in the intake manifold of an internal combustion engine can more advantageously be utilized to operate automatic mechanism to produce automatic throttling effects than can a force mechanically transmitted from a remote point for the same purpose.

In its elementary phase both the function and fundamental structure of a gas

engine governor constitute the development of a torque coincident with increasing engine speed, opposed by a torque possessing identical characteristics, the resulting action of these opposing torques being transferred to a suitable throttle.

The construction of a practical mechanism capable of developing these torques, in itself sufficiently compact to render its installation possible in a necessarily limited space, which is durable and easily serviced, and capable of actually governing an engine within the prescribed limits, has proved an unusual engineering problem.

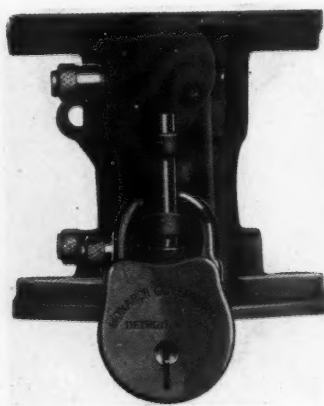
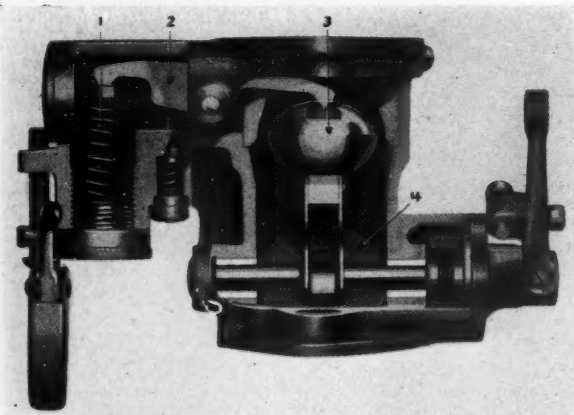
The Monarch governor has only two moving parts and is completely automatic in action. Simplicity in mechanical construction, and its highly satisfactory governing characteristics are the two big features of the Model G governor.

Essentially this governor consists (refer to the sectional illustration) of the spring No. 1, the rocker arm No. 2, the conoid No. 3, the butterfly No. 4, and cone No. 5. The spring is of the conventional compression type and makes possible a wide range of governed engine speeds. Suitable adjustment is secured by removing the cap at the bottom of the spring housing and turning the slotted screw provided for this purpose.

The rocker arm is provided at either end with a hardened ball point bearing that oscillates in a hardened steel cup. The rocker arm is mounted on an ample sized phosphor bronze bushing, which is lubricated by an oil cup and wick.

The conoid or governing member, No. 3, in conjunction with cone, No. 5, controls the governor action. Held normally in a wide open position by the spring, the conoid is acted upon by the velocity of the explosive charge passing from the carburetor to the engine. The increase of velocity overcomes the resistance of the spring and causes the conoid to rise in the tapered cone, closing the butterfly to which it is connected; thus the speed of the engine is controlled. The butterfly shaft is mounted on two phosphor bronze bushings of ample size, lubricated by oil cup and wick.

Installation is universally possible, either in a vertical or horizontal position, because of the absence of exterior drives and the short over-all length of the governor itself.



Cutaway View, Disclosing Principle Units and Their Relation to Each Other and End View Showing Manner in Which New Monarch Governor Can be Locked Against Tampering

### Mason Cushion Truck Tires for Light Trucks

The Mason Tire & Rubber Co., Kent, O., in offering its cushion tire for equipment on light trucks, states that because of the nature and design of its tire construction development of speed with safety is promoted with conservation of the engine and other mechanical parts of the truck.

This tire is of the pressed-on type and is interchangeable with all S. A. E. pressed-on types, avoiding the necessity of wheel change. The tread, which is of strict Mason origin, is claimed to retain maximum cushioning until worn to the bottom of the air pockets, or depressions in the tread. These depressions are said to prevent heating by effectually dissipating the traction wave; they are, also formed to automatically eject stones



Cutaway and Section of the New Mason Cushion Truck Tire for Speed Service

Skidding is stated to be practically eliminated and that effective traction is afforded in sand, snow or mud and on slippery pavements.

The bridges between the depressions of the tread, reinforced by the rubber on the sides of the tire, distribute the load over the entire tread when inequalities of the road are encountered. Peeling and tearing of the tread is claimed to have been prevented by reason of a special process of manufacture, eliminating the continuous grain of rubber.

### Schrader Announces Reductions

The following price reductions, which will be effective on November the 1st, are announced by Schrader's Son, Inc., Brooklyn, N. Y.:

Schrader Universal Tire Pressure Gage, from \$1.50 to \$1.25.

Schrader Universal Truck Tire Gage, from \$2 to \$1.75.

Schrader Universal Valve Cap, from \$0.40 to \$0.25 for a box of five.

Schrader Universal Valve Insides, from \$0.40 to \$0.30 for a box of five.

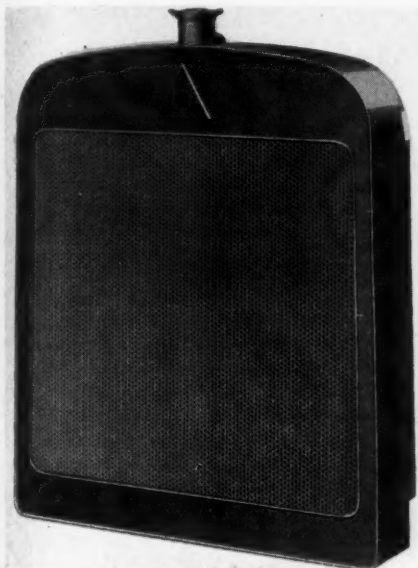
A number of factory branches at important distributing centers of the United States are to be established by the Clark-Turner Piston Co., of Los Angeles, Calif. Already there are branches for the products in Kansas City, Mo., Freeport, Ill., and New York City.



## Perfex Makes Special Speed Truck Radiators

Several designs of radiators for speed truck service have recently been created by the Perfex Radiator Co., Racine, Wis. The same type of core is adhered to in the speed truck designs as used in the standard Perfex radiator, the only important departure being the substitution of the five-unit cast-iron tank for a sheet metal tank, which is in addition fitted with an extra removable steel shell. The maker explains that this construction is most adaptable and economical by reason of the fact that sufficient resiliency and cushioning is inherently provided through the pneumatic equipment and special springs of a speed truck.

These radiators similar to other Perfex radiators are made up of individual tubes, each being live and circulating water. The water channels are large and permit unrestricted passage, clogging be-



New Radiator Designed Specially for Strenuous Speed Truck Service

ing impossible as all sediment can pass through. No fins or spacers are used in the construction of these tubes. Each tube is made by a patented process of forming the material. This process involves the taking of one piece of material twice the depth of the core, the bending of it in the center and, finally, lock seaming it in the back. This method of construction is claimed to do away with 50 per cent of the seams and joints resulting from any other method of assembling. Besides, this one seam is a lock seam which is stated to be stronger than the material itself.

The material used is of .006 thickness, which is standard and used in all Perfex commercial work. The stock is bronze and the core is stated not to be burstable from the expanding action of freezing.

Among the events which tend to show the improvement in business is the fact that the Goodyear Tire & Rubber Co. will redeem as per schedule on November 1, \$750,000 face value of first mortgage bonds at 120.

## Special Erie Speed Truck Tires

The Erie Tire & Rubber Co., Sandusky, O., has brought out a special 35 x 5 in. cord tire especially for speed truck equipment. This tire is of larger oversize than the standard 35 x 5 in. cord for pleasure vehicles and is stated to be more heavily reinforced above the bead.

The tread design follows the regular non-skid design used by the Erie Tire & Truck Co., with but slight modifica-



Erie Speed Truck Tire

tions, which are claimed to give it greater carrying capacity and longer wear than the tire used for ordinary service.

A normal size 3½ in. cord, to replace fabric tires on light car deliveries, has also been announced. This tire is constructed of four plies of cord heavily reinforced above the bead by four plies of fabric. The general tread design is the same as the Erie non-skid except that depressions in the tread are a little narrower than in the company's regular 3½ in. type, thereby quoting the manufacturer, "giving the tread greater wearing service which commends it to commercial car use."

## Swinehart Introduces a Special Speed Tire

The accompanying illustration shows the latest creation of the Swinehart Tire & Rubber Co., Akron, O., which was recently added to its line of pneumatic tires. Considerable revision has been made in the design of the tread of this cord tire, which is rather a departure from the standard tread design.

The maker describes this new tread design as a squeegee tread, because the foremost bars tend to wipe the smooth pavements dry and the following bars cling to the surface, making it an excellent non-skid tire. This tread is produced in all the popular standard sizes, including 36 x 6 and 38 x 7 cord tires, which is equipment for speed trucks.



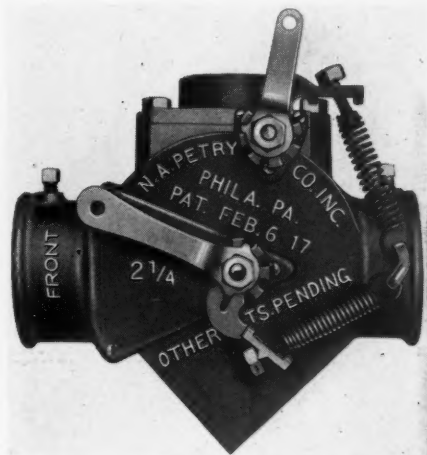
Revision Tread in Swinehart Special Speed Tire

## Petry Heater and Tuning-Up Valve

A new development and product of the N. A. Petry Co., Inc., 328 N. Randolph St., Phila., Pa., is the Petry Heater and Tuning-Up Valve for passenger cars and trucks, operated by internal combustion engines.

This new valve provides two separate outlets for the exhaust, one into the open air for tuning up the engine, which valve can be operated by opening the arm on the valve under the car, and the other direct to the heater. This latter outlet carries the heat of the exhaust. As can be readily conceived, it is necessary to make but one insert in the exhaust pipe line.

Each valve tongue is of malleable iron, with the trunnion hinge machined, and the tongue milled off smooth, to make a tight joint against the milled gray iron valve seat. Springs, the tension of which are not affected by the heat, keep the



Petry Heater and Tuning-up Valve

valves in a closed position. The operating levers are adjustable to different positions.

The top outlet designed for connection to the heater is made in various forms for convenience in connecting pipe lines to the heater. A brass sprag is used to vary the openings of the heater valve. A foot pedal with connections can be had to operate the tuning-up valve.

A complete heater will shortly be announced by this concern.

## Romon Automatic Oil Gun

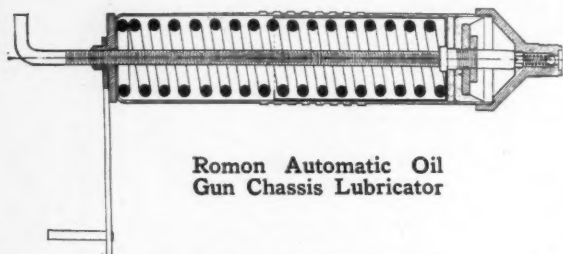
Roberts & Monroe, 35 Warren St., New York City, is offering to the trade a new product, known as the Romon Automatic Oil Gun Chassis Lubricator.

It consists of a nickel plated metal bottle, in which is retained a piston and a heavy coil spring, as the accompanying sectional view clearly discloses.

The oil is contained in the upper part of the bottle, and is compressed by the piston and coil spring. The flexible tubing attached to the top of the bottle is equipped with a check valve, which can be released only by the special Romon

Oil Gun Fittings that replace grease cups and oil cups.

Before filling the device with oil the tension of the spring is released by inserting a long threaded rod, supplied with the outfit, through a hole in the bottom of the bottle. This rod connects with a socket in the bottom of the piston. The



Romon Automatic Oil Gun Chassis Lubricator

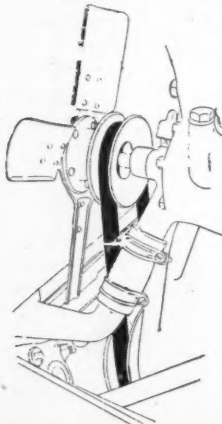
rod is then screwed into place and a nut is run up this rod as far as it will go. A wrench is next used to bring the piston back as close as possible to the bottom, which compresses the spring and releases all pressure from the top of the bottle, allowing it to be filled.

When attached this internal mechanism forces the oil to various parts of chassis.

### Hilab Fan Belts

The Hide Leather & Belting Co., Indianapolis, Ind., in offering its new product, a tough tan leather fan belt, known by the trade name Hilab, states that its engineering department had conducted an exhaustive series of tests to discover ways and means for increasing fan-belt service in those cases where drives have been particularly hard before it finally decided on this latest speed-truck fan belt.

This belt is made from the highest laboratory test leather of a tough tannage



The Hilab Belt is Made From Laboratory Test of Tough Tannage Center Stock

center stock, according to the manufacturer. Steel wire, cable, cartridge, brass, special links, chains or any other type of reinforcement were considered unessential, and were, consequently, discarded in favor of the special tough tan leather prepared by an exclusive process.

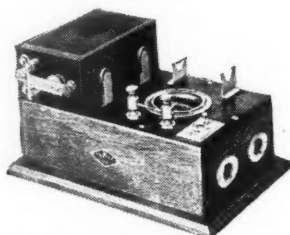
A recent test showed that the total elongation of a number of these belts after they had been in service from three to six months was a trifle over 1 per cent. The average stretch is claimed not to exceed 1 1/4 per cent.

### B-W Tester

The B-W tester put out by the B-W Electric Co., 7421 Manchester Ave., St. Louis, Mo., is a scientifically constructed instrument for testing Ford coil units, single and double contacting lamps and spark plugs. With its use guess work is said to be eliminated, and that a full set of coils can be tested and properly adjusted in a few moments. Furthermore, it is pointed out, a knowledge of electricity is not necessary to properly use this tester.

The case is of hardwood, dark walnut, satin-wax finish, on which is mounted a low ammeter, coil guides with contacts and spark gap. It is also equipped for testing spark plugs and double and single contact lamps. It is fitted with an indicating toggle switch. All fittings are polished nickel.

To replace or readjust contact points on a Ford Coil Unit, an ammeter registering the correct current draw is necessary, as



B-W Electrical Tester

the Unit must give a hot spark with a current draw of not more than 1 1/2 amperes because the Ford magneto will not generate more than 1 1/2 amperes at low speed. Therefore, if the coil is not drawing more than 1 1/2 amperes, the ignition is faulty and the car will not run smoothly at low speed.

The T-B tester is furnished in two types: Type D and Type A, which list at \$11.65 and \$14.35, respectively.

Type D, which is for direct current, is equipped with a D.C. ammeter with cord and clips for conveniently connecting to a standard six-volt battery or dry cells.

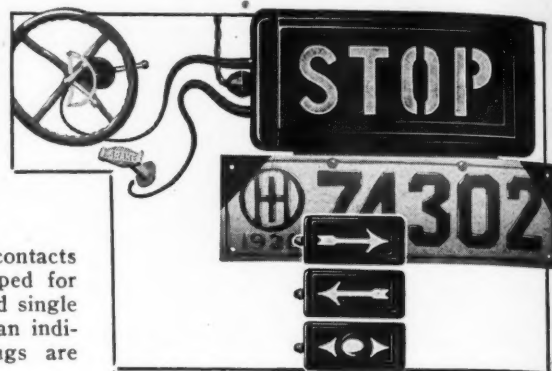
Type A, which is for alternating current, is equipped with transformer, A. C. ammeter, and cord with standard plug for use in any alternating current lamp socket.

### Auto Indicator, a New Mechanical Warning Device

The Auto Indicator Co., Grand Rapids, Mich., is offering a recently developed mechanical signal that is claimed to transmit its signal with equal effectiveness day or night with but little mental and physical effort. The warning flash of this signaling device defines clearly the intention of the driver on whose truck or car it is mounted.

In the designing of this device effort was made to eliminate as many unnecessary working parts as possible with the

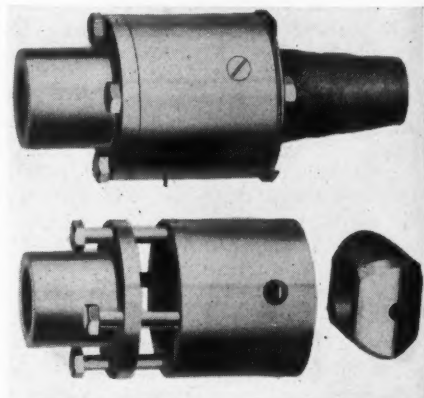
result that the final product contained but one moving part. This one moving part is caused to revolve and flash the proper signal by means of two strong cables separately inclosed in dust, water and oil-proof casings, which lead their respective cables to the brake rod and to a finger tip control on the steering column.



Equipment for Diminishing the Driving Hazard

It operates as positive as the service brake, the instant the brake pedal is depressed and before the brakes start to grip the device flashes "stop" to the driver behind and displays this signal until the brakes are fully released. The "right" and "left" turn arrows are operated at the touch of a finger on the finger tip control close to the steering wheel, without taking either hand off the wheel. A double arrowhead and red bull's eye, which is the indicator's "caution" signal, is automatically displayed when no other signal is in effect. Below the indicator the license is illuminated.

Attachment of this device is simple; complete installation can be made in a very short time.



Pick Universal Joint for Power Take-off and Other Transmission Purposes

This joint, manufactured by the Carl Pick Co., West Bend, Wis., is for use in connection with power take-offs on dump body hoist equipment and other transmission purposes. It is provided with a thorough means of lubrication as well as an efficient means of lubricant retention. It is claimed to be one of the strongest units of its kind on the market today. Because of the exceptionally large bearing surface, wear, is stated to be held at a minimum. It can be made adaptable to almost any form of small propeller-shaft assembly.



# Quality, Simplicity, and Standard Magneto Base, Features the Paquito Unit Battery Ignition System

By C. P. SHATTUCK

**T**O obtain economy and efficiency in the internal combustion engine, a spark that will obtain rapid flame propagation and burn the heavy hydrocarbons present in the fuel of today is required. This is particularly true of the truck engine which uses considerably more gallons of fuel daily than the passenger car engine. That the lower layers of heavy hydrocarbons can be burned, and rapid flame propagation obtained is one of the claims advanced for the Paquito ignition, manufactured by the Paquit Ignition Corporation, 1819 Broadway, New York City.

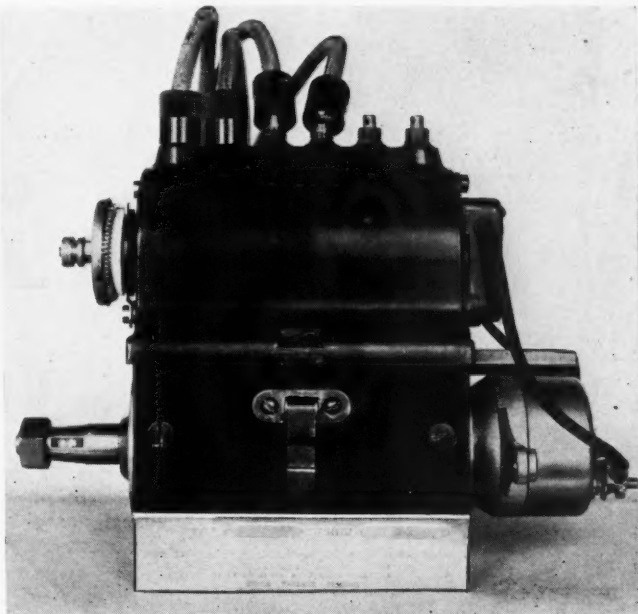
It is held to be the first unit battery system, ie. coil, etc., contained within the one structure, with an S.A.E. standard taper drive shaft and magneto base. The unit is very compact and light, the four-cylinder machine weighing under six lb., and the six cylinder slightly more. The

lation of the component parts, the ease with which these can be disassembled, makes service a simple matter. The Paquito differs from the conventional design in that it eliminates entirely the conventional type of distribution and employs a cylindrical distributor or rotor of hard rubber, parallel with the axis of the rotor shaft which is mounted in the base with oilless bearings although option is

brush impinges. The collector brushes, carried in the side panels of the base, are lightly spring-tensioned, and in contact with high-tensional terminal sleeves molded in the panels. A feature of the brushes is that they extend but 1/32-in. and are sufficient length to prevent chattering. There are two side panels, one on either side, retained by two screws, and the panels can be easily removed for re-

**Right: Showing Numbered High-Tension Connections and Taper Flange or Collar Around Same.**

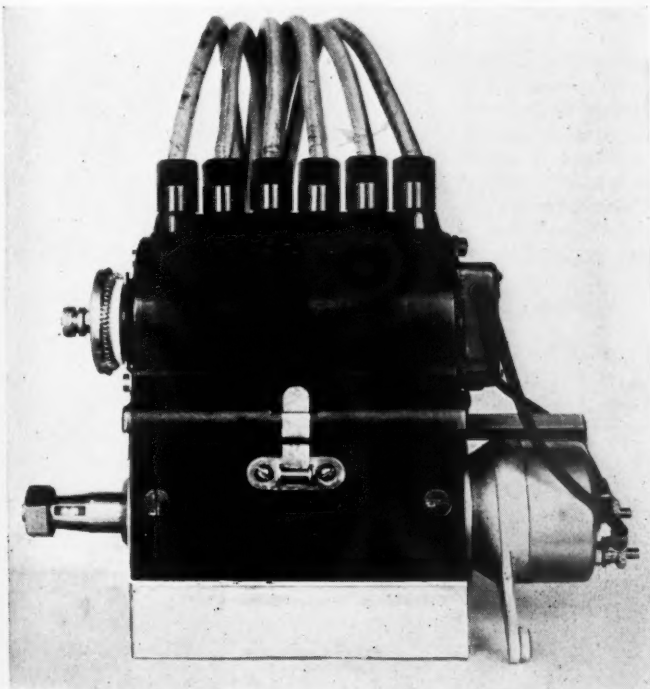
These collars prevent creeping of moisture and subsequently short circuits. The clasp locking coil casing to base is shown displaced.



placement of a damaged brush. The panels are so fitted as to be moisture and dust proof.

## Novel Design of Terminal Sleeves

The coil casing, a unit part of the base, has a specially constructed flange so that with the design it provides a water shed. Split dowels are molded in the case and register with the high-tension terminal sleeves in the coil casing. The coil casing is locked by clasps and its cover is retained on its seat in the casing by screws. This cover carries the high-tension collector brush that impinges upon the collector ring insert in the rotor. As may be noted by the accompanying illustration the wire from the coil is attached to a screw which is in contact with a metal strip molded in the casing cover. This wire is made purposely long to facilitate attaching and to avoid the possibility of vibration crystallizing the strands. The coil is not integral with the casing nor is it imbedded in an impregnating compound, therefore, replacement of a damaged coil is a very simple matter.



**Left: The Paquito, a New Unit Battery Ignition System.**

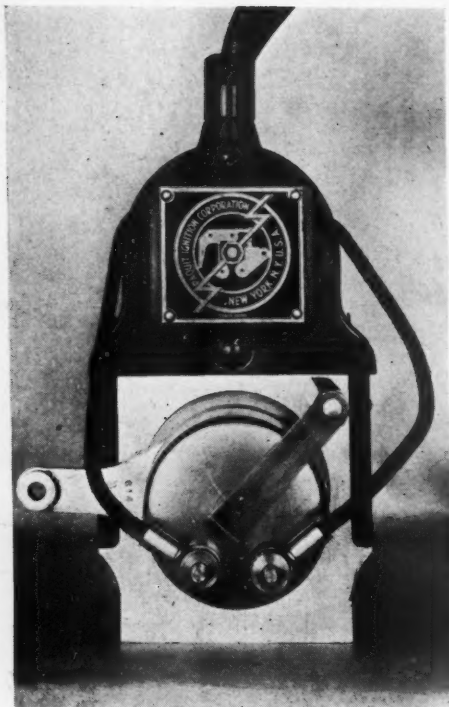
Conforms to S. A. E. standard magneto base, is waterproof, weighs but six lbs., and current consumption is but 1/10th ampere. Claim is made it will operate on a single dry cell.

Paquito system is water and dust proof and the steps taken to avoid moisture conducting current lines are ingenious and well worked out. A number of features are patented both in this country and abroad. The system is the invention of Vital Paquit, a Belgian engineer, and has been developed and refined by D. Bruce Morgan, consulting engineer of New York City.

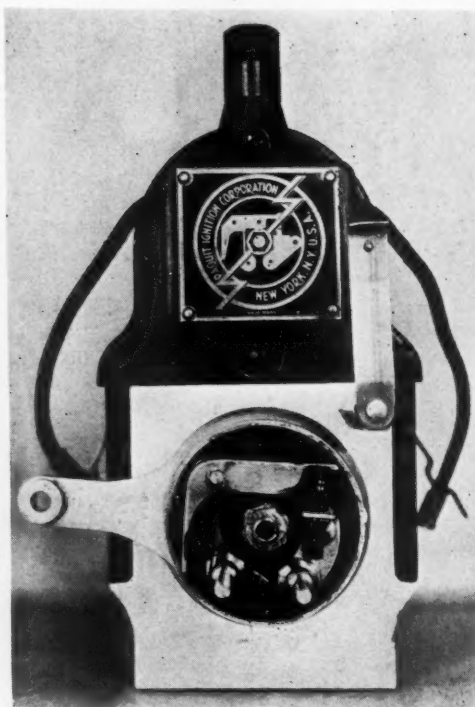
The design is noticeable for its simplicity throughout. The construction and re-

given of Norma ball bearings. The rotor and shaft is light, weighing but seven oz. When operating at low speed, and carrying virtually no load, the bearing stress on the rotor and shaft is negligible.

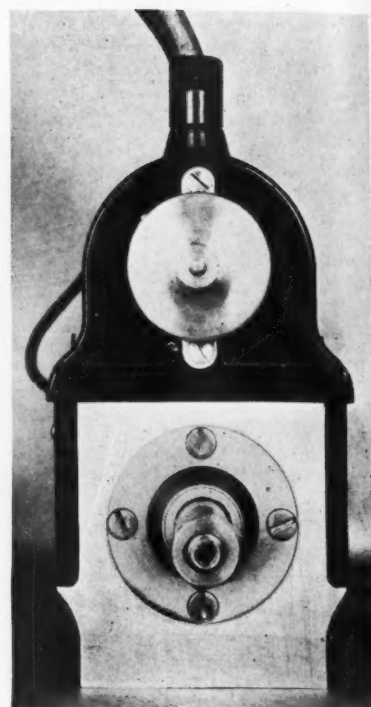
Molded in the rotor are trackless metallic inserts. With the four-cylinder unit there are two distributor inserts spaced 90 degrees apart, three with the six-cylinder, four with the eight and six with the twelve. There is also a collector insert ring upon which a high-tension collector



Breaker End of Paquito and Showing Condenser on Coil Casing. The Casing Flange Extends Over Side Panels Forming a Water Shed.



The Breaker is Conventional Except a Straight Spring is Employed. A Very Rapid and Non-Sticking Breaker is Claimed as Well as Accessible Components.



Drive End With S. A. E. Taper Shaft and Showing End-Plate Forming Bearing Housing for One End of Rotor. The Ballast Coil is Also Shown.

The connections between the dowel pins and those of the spark plug cables are molded in the coil casing. The brass inserts are threaded, as are the terminal sleeves, and the former have a simple, but effective locking device for the wires. An ingenious feature of the terminals is the employment of a taper collar of non-conducting material around the connectors and, as the sleeves have a similar taper, the construction prevents moisture from working up or creeping from one terminal to another.

#### Accessible Condenser

Unlike conventional practice the Paquito condenser is mounted on the exterior of the unit, on the coil casing, where it is accessible. It can be removed by displacing two screws. Two wires lead from the condenser, one to the ground stud of the breaker and the other to the insulated breaker arm. The condenser is a new design, and it is stated that it does not decrease in electrical capacity with heat.

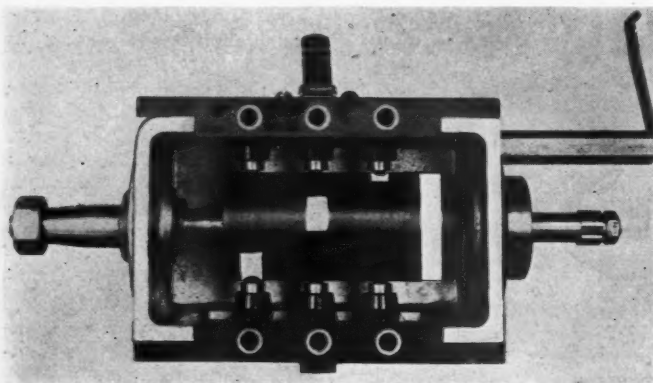
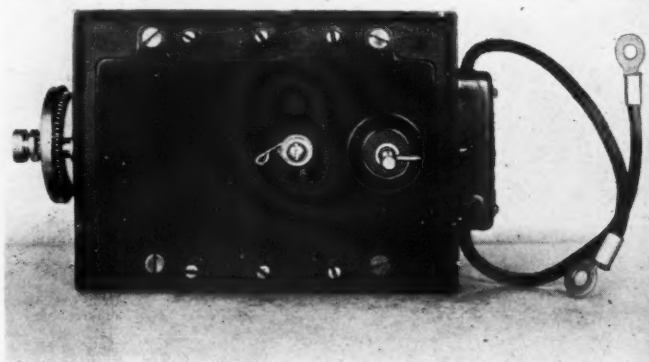
The breaker mechanism is conventional

but it does not revolve with the rotor shaft. The interruption of the primary circuit, or time of spark, is obtained by a Micarta lobe on the breaker arm, the Micarta member being actuated by lobes of a removable cam on the rotor shaft which is the only rotating part of the machine. The feature of the breaker is the straight form of spring employed, it being stated that it has no tension other than initial tension and that the breaker is unusually rapid and non-sticking. The contact points are Tungsten but it is

claimed that burning or fusing action is negligible due to the character of the metal and to the principle of the coil, condenser, and the ballast coil. The contact point of the breaker arm differs from conventional design in that it is not integral or permanently attached. In the event a new point is required a Paquito point can be replaced easily as it screws and locks in and does not involve the expense of an arm and a point. The coil is of a conventional design, having a very high frequency, high saturation periods, and ex-

#### Right: Distributor Rotor and Shaft, the Only Rotating Component.

The brushes are carried in a removable side panel, and dowel pins in coil casing register with high-tension sleeves molded in panels. The cam is removable and provides for either clockwise or anti-clockwise drive. No lubrication required.



#### Left: Coil Casing With Dowel Pins, Showing High-Tension Collector Brush That Impinges Upon the Ring in Rotor.

The coil cover is retained in seat by four screws and the axis of the coil is parallel with the rotor which is of hard rubber.

tremely rapid recovery. The extreme point of saturation occurs at 5,000 r.p.m., but with the Paquito this would require an engine speed of 10,000 r.p.m. which speed is not practical with the present-day design. The Paquito, therefore, differs from conventional design in that the unit or drive shaft is driven at half engine speed. This is held to be an advantage in that it permits better saturation of the primary, thereby obtaining rapid flame propagation at all engine speeds.



It is also pointed out that the wear is reduced 50 per cent. A feature of the system is the low current consumption, it being stated that it draws but one-tenth amperage at a car speed of from 25 to 30 miles with a six-volt system.

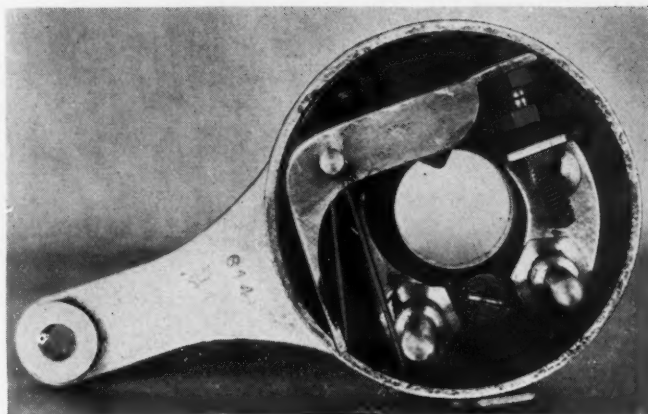
#### Operates on One Dry Cell

It is stated that the Paquito can be operated on a single, conventional dry cell by cutting out the ballast coil and that sufficient current will be supplied to operate the truck from 30 to 50 miles under normal conditions. In the event of storage battery trouble on the road a dry cell can be used as an emergency and the cost would be small. It is also stated that the system will function efficiently with the average generator supplying current, provided the cut-out of the generator is disconnected. It is also claimed that the Paquito will function when the battery is so low that the horn cannot be sounded or lights burn.

The four-cylinder model is balanced for 75 lb. compression and with a safety factor of 25 lb; the six-cylinder at 85 lb. and a similar factor of safety. There is a safety spark gap which is unusual with a battery system of ignition. It affords protection to the coil from grounding of the high-tension circuits. Change may be made from clockwise to anti-clockwise drive by shifting the lobe of cam 10 degrees to the right or left as may be required. The advance is manual on the standard four-cylinder and six-cylinder horizontal units, but automatic control, as well as manual, is employed with the special six-cylinder system.

To meet the requirements of those engines not adapted to the half engine speed of the Paquito, its makers supply a special coupling which permits any desired speed, and at a low cost. The four and six-cylinder types were especially de-

**The Breaker Differs From the Conventional Design in That a Straight Spring is Employed and Its Contact Point is Not Integral With It, But a Separate Unit. This Makes Possible Replacement of a Worn Point at a Minimum Cost.**



signed to meet the exacting requirements of a truck engine. The company is also in production on a unit vertical system adapted to Continental engines. These units which are driven at conventional speed, are standard, and require no mechanical change in engine design.

The design of the Paquito truck unit is such that service by the dealer should be an easy and simple matter inasmuch as the mechanic is familiar with the conventional breaker contacts and their care. The Paquito can be entirely and quickly disassembled and reassembled with a screw-driver and pliers. The components are few and easily gotten at. Even the rotor is easily displaced, it being dismounted by removing four screws in the end plate. Cleaning, etc., of the contact points is readily accomplished as the breaker may be displaced by hand and the work performed conveniently. The breaker arm also can be quickly displaced. The wiring is simple, there being but one switch wire.

The Paquito units are the result of seven years' experimentation and nearly

two years' road tests, and in offering them to the trade the makers believe they have a simple, dependable, quality system which will obtain considerably greater mileage to the gallon of fuel, better acceleration and more power than the conventional design, because of the ability of the machine to supply a spark that will burn more of the heavy hydrocarbons of the fuel of today. The finish and workmanship are first class throughout and attention has been given to those small details which spell longer life, dependability and low cost of maintenance.

Claim is made that the system, because of its principles, will supply a hotter spark than the conventional battery system at low engine speeds and is more efficient than the magneto at high speeds. The Paquito (pronounced Pa-Kee-To) will be produced with standard base for four and six-cylinder passenger car engines, also vertical types for 8 and 12-cylinder passenger car power plants, as well as for aviation, stationary and all forms of combustion engines. Production at present is centered upon standard units.

## Who Says the Truck Industry is Not Improving?

**T**HAT the truck industry has improved in the past few months despite opinions to the contrary is indicated by a canvass among the leading commercial car manufacturers by the CHILTON COMPANY. The statistics obtained covered the increase or decrease of sales for September over August in the seven sectional districts of the country.

The largest sales increase is registered in the Middle Atlantic section consisting of New York, Pennsylvania and New Jersey. A spurt in construction work, including the building of homes and office buildings greatly aided the truck industry. Much road improvement and the opening of new highways in the section was responsible for a demand for road-building vehicles. The sales, however, have been representative, retail merchants and city manufacturers taking part of the output.

The South Atlantic states, composed of

Delaware, Maryland, West Virginia, Virginia, North and South Carolina, Georgia and Florida show a sales improvement over August although not quite to the extent noted in the Middle Atlantic section. In the former section, coal dealers and operators were doing some truck buying. Road-building, oil operations, building materials and general trucking were responsible for many sales. One firm reports the sale of trucks to townships to place in operation the consolidated school system which is becoming so popular in various sections of the country.

September showed a woeful lack of buying by the farmers. Those sections of the country where farms predominate showed the smallest increase in sales of trucks. In several cases the buying for September was even less than in August.

A number of sales increases were noted in the East North Central section, composed of Wisconsin, Michigan, Illinois,

Indiana and Ohio. Here the lumber dealer, the retail merchant, the milk dealer, the packer, the bus and jitney business and the contractor were the best buyers.

Returns from the Pacific Coast section were below expectation although several companies showed substantial gains in this locality. The mountain section was the least active.

The stock of trucks in dealers hands during the month of September had in nearly all cases been decreased. These dealers are preparing for the 1922 season by cutting down their heavy inventories. Indications from the factories show that the stocks are being depleted in preparation for next year's production.

Medium weight truck models are moving faster than the other models. There is a demand for the light delivery truck in the cities and some of the largest sales increases were noted in this class. The heavy trucks are being used by the road builders.

The general business tone among the manufacturers is better. October sales will surely show a slight improvement over September and dealers are hoping for a continued improvement in November.



## SERVICE AND REPAIR DEPARTMENTS



*Service Managers:*

### Are You Merchandising Your Service?

Have You Convinced Your Patrons of the Importance  
of Taking Advantage of Service Station Advice?

*This Article Tells How, Through Your Knowledge of  
Mechanics and Experience, You Can Sell the Owner  
on the Importance of Attending to Minor Repairs*

### SALESMANSHIP BREEDS CONFIDENCE

By C. P. SHATTUCK

A SERVICE manager who has had considerable experience, recently made the complaint to the writer, that despite his efforts to induce customers to send their trucks into the service station for adjustments and minor repairs—thereby lessening the ultimate cost—that no plan he knew of was successful. In other words, he contended that it was difficult to get the owner to take advantage of the service station's advice because he associated visits to the service station with thoughts of big bills of expense. Other service station managers have expressed themselves in a similar vein.

What is wrong? Why is it that the service station managers state that the average owner will not come to the service station unless his truck has reached a non-operating condition? Is it because he believes that he will be "shaken down" for his last penny or is it because he has not been properly sold? After weighing the pros and cons one is led to arrive at the conclusion that the right kind of effort has not been made to sell reduced operating and maintenance costs or, if you please, the fundamentals of service.

#### And What is Service?

For the past year everybody in the industry has been talking service, against it or for it, preaching it and discussing it. Service associations have been formed to better service. The factory service managers have an association, and at the last two conventions the opinion was

unanimous that "their bread and butter of the future depended upon the right service, the satisfied customer." And the writer has been guilty of discussing service and describing how A-1 dealers rendered it.

#### What's Wrong With Service?

If the truck industry believes it has attained that point where it has evolved service, then the only deduction that can be made from the remarks of the service manager referred to in this article is that in their endeavor to spread the service propaganda the rank and file have forgotten the most essential factor in business, and that is **salesmanship**. When that service manager said he could not get his customers to heed his advice, and those he did get in, didn't stick, it was an admission, an unconscious one, perhaps, that he wasn't able to sell them what they should have.

Every purchaser of a commodity, necessity or luxury has to be sold. He has a reason for buying and that reason is either supplied by himself or by another. In the case of food, we purchase it because the human system demands it or our stomach calls for it. Other commodities are also sold indirectly because of necessity. But when one is approached by a life insurance agent he generally has to be sold. For example, take a husky young man, never ill a day and so full of pep he is boiling over with energy. Does he welcome the insurance agent with open arms and place his name on the dotted

line? He does not. He is more likely to laugh at the agent, but—the insurance agent sells these husky, red-blooded youngsters. How does he sell? Why through intensive sales effort, proving to the young man that while he is now well, has enjoyed the best of health, that his day will come. The agent is also armed with statistics to prove the percentages of illnesses and accidents, and when he gets through the young man is likely to discover symptoms and the dotted line gets the signature.

What we need in the service campaign is a whole lot of the insurance type of salesmen. Men are needed who can sell the truck owner insurance or protection against lost time, unnecessary expense, dissatisfaction, etc. When a mechanic or inspector reports that the engine of Brown's truck is full of carbon and valves need grinding badly, **Brown needs a salesman to sell him**. Some dealers think they have a salesman when they appoint a young man to meet the customer and the former tries to persuade the owner to have such and such work done. Some of these service salesmen are efficient, but lots are not. Merely telling Mr. Brown that the carbon should be removed and valves ground "because the engine will have more pep, etc.," isn't selling. It is a weak explanation. If the salesman gets the OK for the work, he and the dealer think that the work has been sold. Not so, for that is merely a case of taking an order.



### Combating the Procrastinator

Take the matter of brakes, for example. Suppose the inspector reports that the brakes on White's 5-ton job need relining and that neither the service or emergency can be further adjusted. The service salesman will advise that the brakes should be relined, that it is dangerous to operate a truck with brakes as is. The prospect shoots right back with, "Well, how much will it cost me?" Now if the salesman replied it will be around \$50 for material and labor he has sold the average owner not to have the brakes relined. The real salesman will ignore the price question and sell the prospect on either what it would really cost him in a damage suit plus lost time of the truck and repairs or instill in the mind of the prospect a desire to become an observer of motor vehicle laws. The high grade salesman sells the goods and side steps price, and if the price cannot be side stepped the salesman has sales ammunition.

### Cheapest and Best Insurance

The point the writer is endeavoring to establish is: first, that the vision of a big repair bill tends to keep the owner from taking out insurance in the form of frequent inspections, adjustments and small repairs. Second, the average service manager is not gifted with sales ability, for after all, mechanics is his trade. The service manager, or his foreman, may explain why certain work is needed, the mechanical part, but he lacks that gift of salesmanship, that talent of convincing the prospect that it is imperative to have the work done and is glad the matter was brought to his attention. The real secret of salesmanship is to make the buyer satisfied with his buy and do not the service advocates value the satisfied owner? Do they not preach the gospel of the satisfied owner?

The real service salesman could combat the cost resistance if he would or could turn the tables on the prospect, place him on the defensive, as it were. Suppose Mr. Dealer, you were ill, and your doctor, in whom you had all the confidence in the world, advised you, warned you, that unless you took a rest from your work you had best make your will and get an estimate from the undertaker. Of course, you might tell the medical man that you couldn't afford to leave your business. Some do. But it's a good guess that you would afford the rest because the cost of the funeral would be more.

### Real Salesmen Are Needed

What the service station needs to combat the owner who procrastinates is a prescription similar to that given by the M. D. In other words, supply figures showing what it will ultimately cost for deferred work and do not forget to throw in the expense of lost time, etc., for good measure. If you haven't these figures, cultivate the sales manager and learn what fixed charges mean to an idle truck. Shoot some of this stuff, plus, to the man who says, "Well, I guess I won't have the work done today, but I know it should be done, but, anyhow, it will have to wait a while until I can afford it or

business is better." Hand this fellow some cold figures on what it will really cost him for procrastinating. Have the dope so complete and exact that you can easily stretch his hide on the wall.

Salesmanship is necessary. It is needed by the service station to break down this resistance. Mechanics can be taught the basis principles of a unit and can be educated to short cuts in adjustments and repairs; time and labor saving tools and machinery can be installed; systems can be devised to increase the efficiency of the men; bonuses can be introduced to spur the mechanics to greater efforts; piece work may accomplish much; profit-sharing may be beneficial but, after all is said and done, the work or service, or efficient methods must be sold.

### The Solution of Service

The solution of the service managers' complaint, namely, their failure to get the customers into the shop, is salesmanship. Advertising will break the ice. Circulars, folders, letters, etc., will assist, but the customer must be sold on the service idea.

### Revenue Bill Affects Industry

Washington, November 10. The new revenue bill, which will be law by the time this article is printed, makes a number of changes of interest to manufacturers of motor trucks and passenger automobiles, as well as to dealers, on a large as well as a small scale, in each. As the bill went to conference from the Senate it represented a disagreement with the House as to the surtax on incomes, the maximum Senate bracket being 50 per cent, as against the House, 32 per cent. Under the old law the amount was 65 per cent.

The Senate bill repeals a number of taxes, among them those on indemnity and surety (stamp taxes). Individual incomes of \$5000 or less are decreased through the increase of the exemption to

If he believes he is saving money by keeping away from the service station he must be convinced that he is wrong.

If he contends that repair bills are high, he must be shown why they are high and why he is to blame. It is going to take high grade salesmen, men who know mechanics, costs and human nature, to sell the owner on the fact that the service station can save him money, and enable him to decrease his operating expenses. Service, which after all, means repairs or adjustment, insurance against real trouble, must be sold on a business basis and free from glitter, tinsel and generalities.

It may be that a new type of service manager will have to be developed in the service station. It may mean that the function of selling the owner may be partly or wholly assumed by the sales department. When service is really merchandised, we will hear no further complaints about not making them "stick when we get them in," for service cannot be sold unless the product is right, the price right or, putting it another way, the buyer receives full value.

the head of a family to \$500, with an allowance for each dependent child of \$200. Increases include corporation income from 10 to 15 per cent, and changes, as to corporations, through the repeal of the \$2000 normal exemption on those having a capital stock in excess of \$25,000. The Senate bill repeals all transportation taxes as of January 1, 1922.

### Rumor Denied by Republic

Rumors that the establishment of factory branches in Boston, New York, Baltimore, Pittsburgh, Detroit and Chicago foreshadowing the placing of the company's present system of distribution, is emphatically denied by Republic Truck Sales Corp., Alma, Mich. The denial is made through Frank E. Smith, first vice president and general manager.



### Specially Designed Body for Western Telephone and Telegraph Service

This motor truck has been equipped with a special body for operation by the Pacific Telephone and Telegraph Company. Three collapsible seats are provided along one side for carrying the workers. After folding seats, the entire body can be used for carrying material. A removable step is also provided at the back. A winch, controlled by the driver is provided immediately back of the driver's seat. The arrow at rear shows a special arrangement of steel plates over which the cable passes when being pulled by the winch. These plates guide the cable into a pulley attached below the plates.

## Service Station and Repair Shop Appliances

### Cincinnati Hy-Speed Tapper

The Cincinnati Hy-Speed Machine Co., Cincinnati, O., has recently placed on the market a new line of Automatic Tapping Machines.

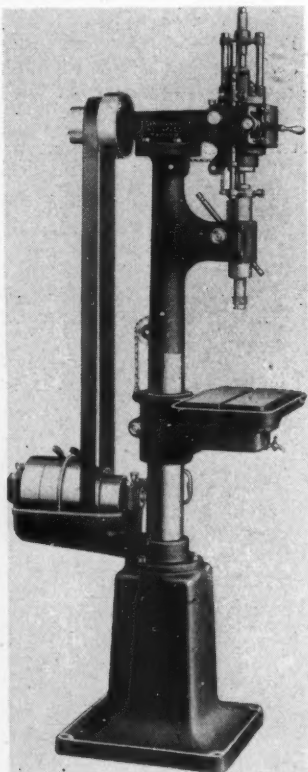
Among the features of the machine are the spindle lead and automatic reversing mechanism. With the use of the lead device, the tap is brought forward and returned in a positive way free of operator, permitting holes to be accurately tapped without danger of stripping thread or breaking tap.

One-half turn of the stop plunger at the side of control handle changes the machine from a semi to a full automatic. When set as semi-automatic the spindle travels forward reverses automatically and stops at end of return stroke. To start forward again the operator pulls down on the control lever.

When set as full automatic, the stop plunger is withdrawn and the spindle then automatically reverses at each end of its travel. The spindle can be stopped at any point, reversed and again brought forward by use of the control lever.

Adjustable trip dogs, with limit stops on the trip rod regulate depth to be tapped. The chuck is driven by a clutched end on the spindle and locked in position. S. K. F. bearings are used throughout machine.

The machines are regularly furnished for R. H. tapping, and attachment is furnished for L. H. tapping, which may be



One of the Line of the New Automatic Tapping Machines Recently Announced by the Cincinnati Hy-Speed Machine Company.

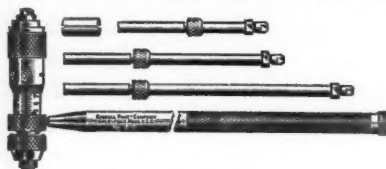
quickly attached to the end of the rack sleeve. Machines are built from 1 to 3 spindles in two sizes. Maximum capacity,  $\frac{1}{2}$  and  $\frac{3}{8}$  in. steel.

Capacity  $\frac{1}{2}$  machine is equipped with tight and loose pulleys, and the  $\frac{3}{8}$  machine is equipped with a single pulley direct overhead drive. Tables are furnished with No. 28 B. & S. tee slot. Pump and tank are attached to base.

In addition to the type illustrated, these machines are built in bench and belted motor drive.

### New G-P Inside Micrometer

A recent addition to the already numerous list of automotive tools produced by the Goodwell-Pratt Co., Greenfield, Mass., is a new inside micrometer, known as No. 618. This new micrometer will accommo-



New Goodell-Pratt Inside Micrometer No. 618

date all inside measurements ranging from two to six inches to 1-1000 of an inch.

The feature of the tool lies in that it can be employed in places inaccessible to the hands. Extension rods of various sizes are provided (note the accompanying illustration), increasing the scope of the tool's utility. The extra rods not in use are retained in the hollow of the handle.

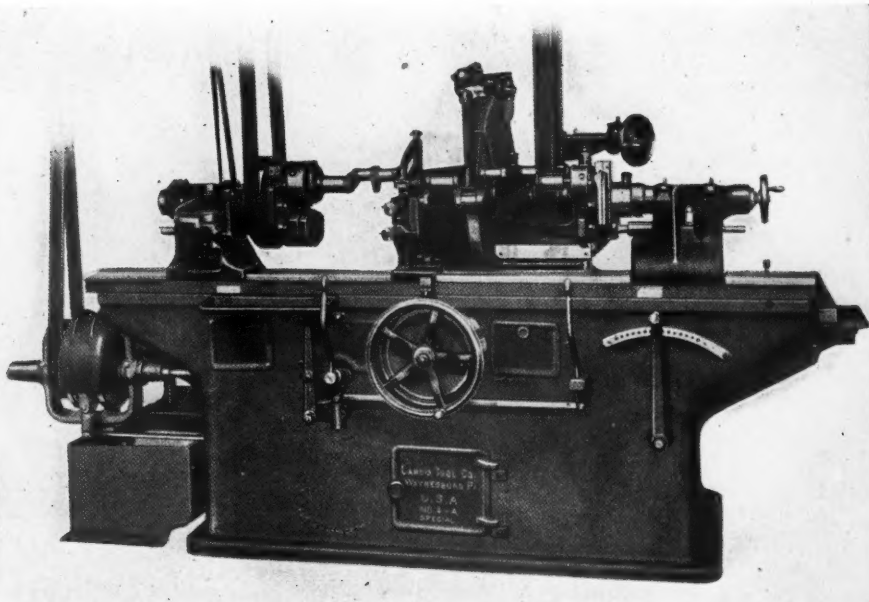
The price, complete with handle, rods and collar, is \$12. A leather case for encasing the tool is listed at \$1 extra.

### Landis Offers Two Machines for Repair Shops

The Landis Tool Co., Waynesboro, Pa., with New York offices at 51 Chambers St., long connected intimately with the automotive industry in the manufacture of machines specially designed for use in the production and repair of automotive vehicles, is now offering, particularly to commercial car service station and repair shop men, two machines declared to enable the turning out of not only satisfactory and accurate but economical work. They are the Landis No. 4-A Special for regrinding crankshafts and transmission gears, etc., of any truck, automobile or tractor, and the Landis No. 5 Cylinder Grinding Machine for grinding the cylinders of any make engine in a minimum period of time.

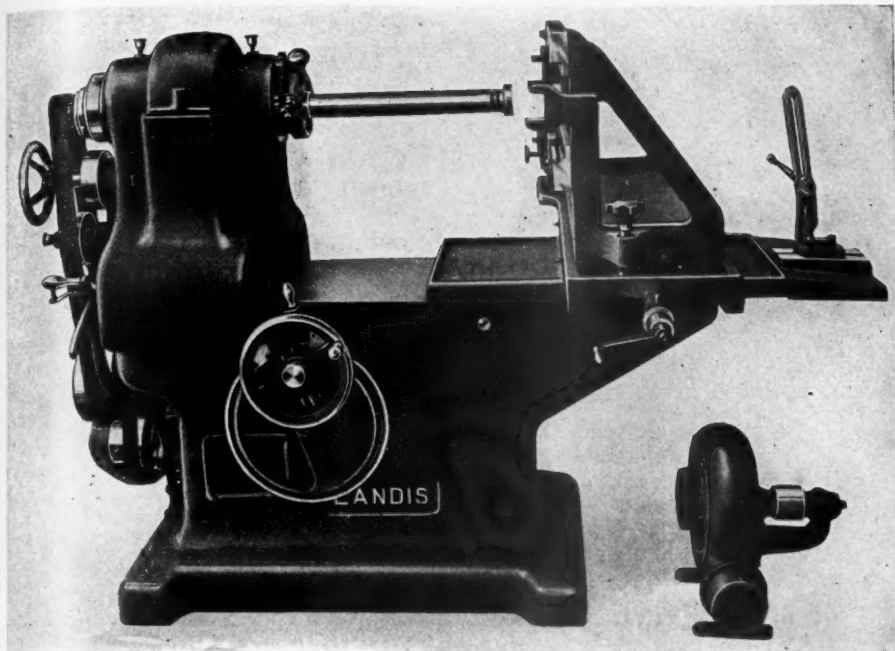
The No. 4-A Special, which can be employed for regrinding any engine part, is particularly adapted for the small repair shops and garages not having a volume of similar parts. Constant efforts along the line of improvement has given birth to many new developments which have been incorporated from time to time, with the result that the present machine contains many features invaluable to the repairman. The following is a brief descriptive outline:

The work-carrying table swivels for grinding tapers and has two scales graduated in degrees and in inches per foot. Short abrupt tapers are taken care of by the head stock swivel. The spindle revolves for chuck or face-plate work and is arranged to be locked for grinding on dead centers. The manually operated foot-stock spindle is provided with a variable tension spring, or it may be held rigidly for supporting the center to the work.



Landis Crankshaft Re-Grinding Machine for Garage or Repair Shop





This Landis Cylinder Grinding Machine Has Sufficient Capacity to Accommodate All Makes of Engines. The Centering Bar is a Marked Feature of This Machine

In the grinding wheel head, back lash is automatically taken up by the long guides of the slider. The spindle runs in bronze bearings adjustable for wear. The entire head swivels on the carriage for grinding abrupt angles on work which is held between centers or supported in the center rest, and is graduated 90 deg. each side of the center line.

The grinding wheel traverse feed is automatic, and the full range of speed variation is made by the movement of the single lever, requiring no shifting of gearing, clutches or belts. The grinding wheel carries automatically at reversing points, permitting the wheel to grind itself clear at shoulders before reversing; if desired, the time of tarry can be varied.

Grinding wheel truing fixtures include one for truing the face and another for the sides of the wheel; also, on special order, a radial truing fixture, for forming an exact radius on the edges of the wheel to grind fillets up to  $\frac{1}{2}$  in. radius.

Work is supported at two points by the rests, underneath and in front. These supports are adjusted independently of each other. This plan of construction is claimed to insure the work being ground round and free from chatter. The countershaft has self-oiling and self-aligning bearings and is easily installed.

The No. 5 Landis Cylinder grinding machine is of rigid construction, the bed consisting of a single casting. Special provision has been made for rapidly obtaining alignment of holes to be ground. The machine may be arranged for either directly connected motor drive or belt drive from lineshaft. The countershaft is of simple construction with tight and loose pulleys, which require a single belt driving machine.

Two eccentrics, one within the other, make up the grinding wheel head. Wheel feed is obtained by a mechanism located on the front of the spindle. Rotary movement of the spindle is controlled by a conveniently located lever.

A roller curtain protects the flat and the dove-tail guide, on which the carriage slides, from dirt, grit, etc. The dove-tail guide is gibbed to compensate for wear.

The traversing movement of the carriage is automatic through rack and pinion and is reversed by self-locking adjustable dogs.

The cross slide is mounted upon the work carriage and its movement is effected by a screw and nut. A graduated dial on the screw affords a convenient and accurate method of transferring from one position to another. Attached to the cross slide is the work carrying fixture, which consists of two adjustable bars for holding the work.

A centering device for aligning cylinder block, locates the holes in vertical alignment with the center line of spindle rotation before clamping. The wheel truing device may be clamped on the lower work clamping bar of the work carrying fixture.

### Fawasco Steel Wrenches

Among the diversity of products manufactured by J. H. Faw, Inc., 27 Warren St., New York City, steel wrenches of all descriptions represent one of the big items. Two special designs of wrenches are offered by this concern as being particularly adaptable to speed truck service and repair work. They are known as the Double Hammer Head and "Zee" Hammer Head wrenches.



Two Special Designs of Fawasco Wrenches

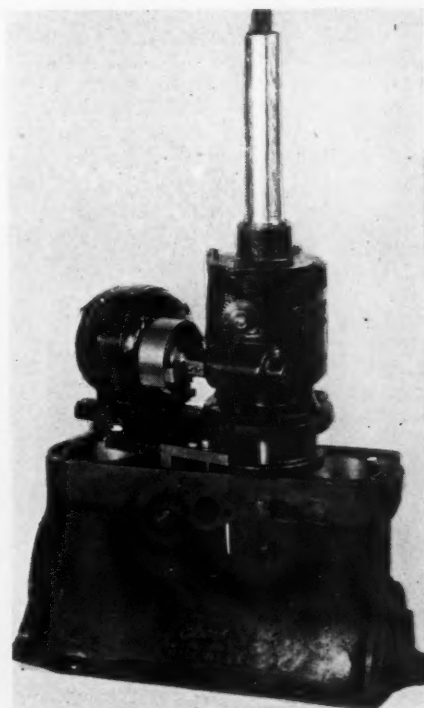
The Double Hammer Head wrench is really a "set" of wrenches in one piece. This wrench by doubling up combines four openings, 5-16 in., 9-16 in.,  $\frac{3}{8}$  in. and  $\frac{1}{2}$  in., and fits  $\frac{1}{8}$ -in.,  $\frac{3}{8}$ -in., 7-16 in. and  $\frac{1}{2}$ -in. cap screws and nuts. It is ten inches long and weighs 15 oz. Balance and leverage are especially pointed out as features by the maker. It is constructed of tough steel socket stock. The price is \$1.60.

The Zee Hammer Head combines with a double head, an offset with leverage of sufficient strength to properly handle any work. The openings are  $\frac{7}{8}$  in., 11-16 in. and 15-16 in. hexagon. It is 10 in. long and weighs 1 lb. The list price is \$1.30.

### Van Dresser Electric Cylinder Reboring Tool

The Van Dresser Electric Cylinder Reboring Tool, manufactured by the International Purchasing & Eng. Co., 506 McKerchey Bldg., Detroit, Mich., is featured because of its portability, its sturdy and foolproof construction and its boring range, which extends from  $2\frac{3}{4}$  in. to 5 1-16 in.

Other features of construction are: A solid hardened and ground feed bar containing no threads; long heavy bearings,



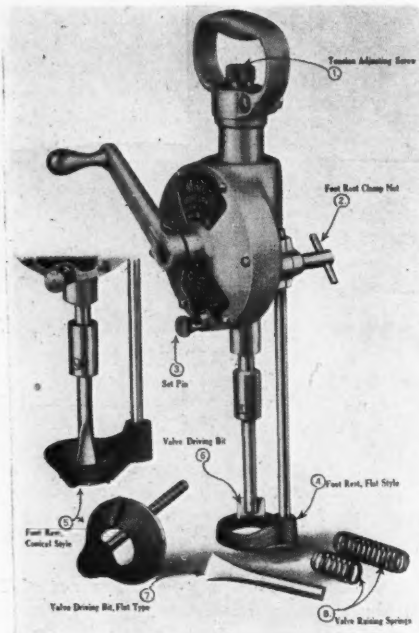
Van Dresser Electric Cylinder Reboring Tool

$10\frac{3}{4}$  in. in length; a special centering device, which is said to be foolproof; a tapered arrangement for fitting boring head in feed bar, which arrangement makes for positive accuracy; six high speed blades; a quick return feature that allows the boring head to be brought instantly to the starting point; and the elimination of split guide rings.

Without the necessity of a change, this tool can be employed for work at any time by hand or drill press.

### One-Minute Valve Grinder

The operation of the One-Minute Valve Grinder put out by the One-Minute Valve Grinder Co., Ranier, Minn., is based on a new principle, combining intermittent ro-



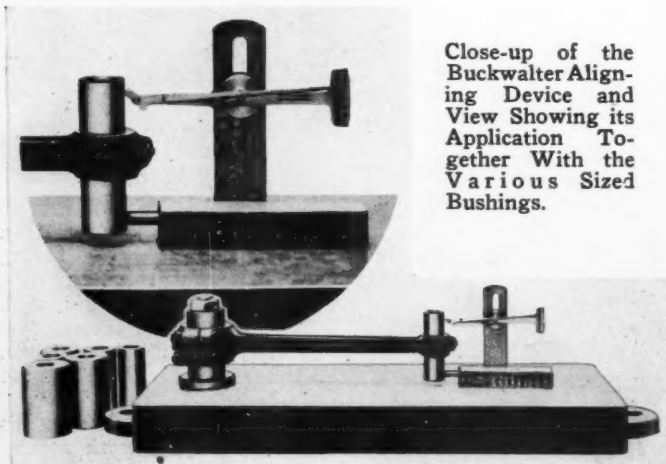
One-Minute Valve Grinder

tating and hammering action. The maker in explaining the action of this tool, states that the positive hammering firmly imbeds the abrasive between the seats, and each raise of the valve provides to replace the abrasive into a new position.

### Buckwalter Aligning Device

The John S. Buckwalter Co., 413 N. Mary St., Lancaster, Pa., describes its new product as an accurate tool for aligning connecting rods. This aligning device is equipped with nine different sized bushings, making it applicable for rods of all makes of cars and trucks.

The bushings are clamped against a hardened and ground steel washer (note the illustration) lying on the plate by a  $\frac{3}{4}$  in. stud firmly secured in the base. All tests for determining whether a bend exists in the rod are made on the end of the piston pin in all positions, and for



Close-up of the Buckwalter Aligning Device and View Showing its Application Together With the Various Sized Bushings.

determining twists, tests are made on the side. The base of the device is 20 in. long, 8 in. wide and 2 in. high. The under side of the base is strongly reinforced with heavy ribs to prevent from warping or springing. At its thinnest point the base is but one inch thick. Two lugs and  $\frac{5}{8}$ -in. bolts are provided with the device for attaching securely to a bench.

### Dayton Automotive Wampler Test Fixture

Equipment that should be of special interest and value to the service station manager and others concerned in electrical work, especially in electrical repairs, is the Wampler Test Fixture offered by the Dayton Automotive Specialty Co., Dayton, Ohio.

The following is a descriptive resume of this equipment:

The motor is a D.C.,  $1\frac{1}{2}$  hp., 3400 r.p.m. special type, developed for test work and arranged to furnish nearly normal rated horsepower at 1500 to 1800 r.p.m. It is furnished in 32, 55, 110, 220 and 240 volts. Drive is direct through universals of Oldham make, or through three jaw universal chucks with flexible mounting.

A movable table directly in front of the motor and parallel to the motor armature shaft offers quick and simple adjustment from the smallest type magnetos to the largest type of generators. All apparatus is securely held in testing position by a quick adjusting clamp extending through the table top and equipped with a strong clamping screw.

The tachometer is of the electric type and its accuracy is guaranteed. The meters are of the flush mounting type and are manufactured by the Weston Electrical Instrument Co.

A Micarta panel fitted with special type connectors said to assure perfect electrical

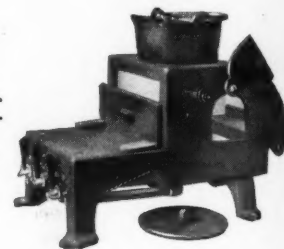
contact is used. The control box, which is special, is mounted on the side of the fixture and is provided with both reverse and main line switches. A special fuse block, making fixture independent from other circuits, is also provided. A wide range of speed control is afforded by a specially designed rheostat.

Fixture dimensions are as follows: Height, 63 in. to top of instrument board; length, 51 in.; width, 27 in. The weight is 600 lb.

### Johnson Gas Furnace

A furnace, that will temper, anneal or case harden any carbon steel tool within its capacity, known as the Johnson No. 118 Gas Furnace, is being marketed by the Johnson Gas Appliances Co., Cedar Rapids, Iowa.

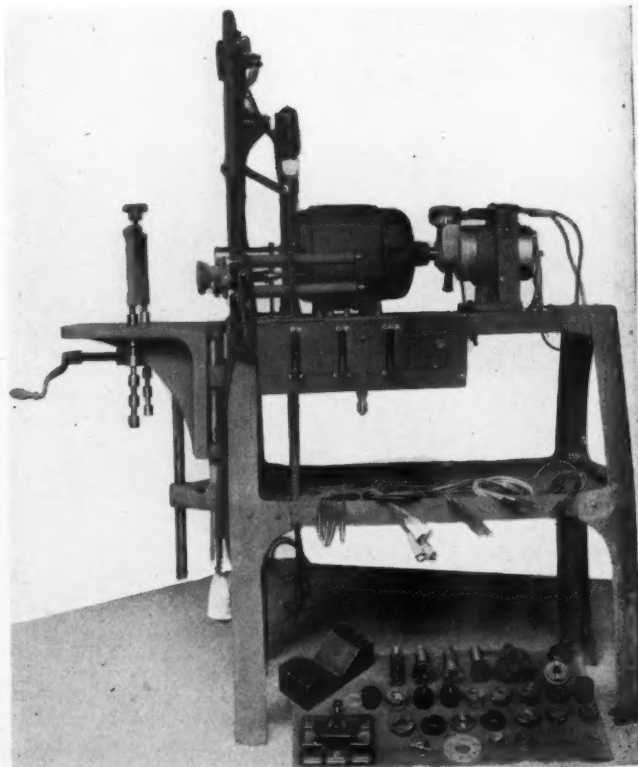
A special feature incorporated in this furnace is the Johnson Bunsen with an



Johnson No. 118 Gas Furnace.

adjustable orifice, that compensates for the varying conditions of air pressure and quality of the gas.

The lid on the hood may be removed, as shown in the illustration, and a 20-lb. capacity melting pot inserted for the melting of soft metal. It is equipped with three burners, which, it is said, will produce a heat of 1800 deg. Fahr. in the fire box. Size of the fire box is  $6\frac{1}{4}$  in. x 5 in. x  $6\frac{1}{2}$  in.; mouth, 4 in. x 6 in.; length overall, 15 in.; melting pot, 6 in. in diam.



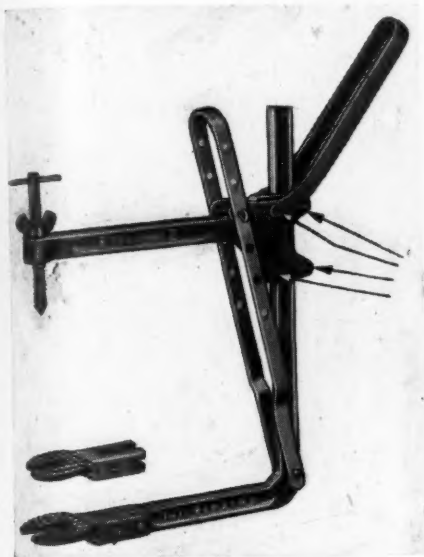
Side View of the Wampler Test Fixture Offered by the Dayton Automotive Specialty Co.



### E-Z Valve Spring Compressor

The adaptability of the E-Z, Beats-All Valve Spring Compressor introduced by the E. J. Zeman Cycle Co., Two Rivers, Wis., gives this tool valuable utility, in that it will accommodate all types of engines. All adjustments of length are made by changing the position of a cotter pin from one to another of six holes, spaced at regular intervals along the fulcrum member of the device.

The operation of this compressor is based on the compound leverage principle, which, it is pointed out, will give a true vertical lift on the valve spring, and thus safe-guard the valve spring against



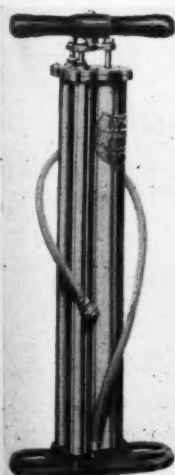
E-Z Beats-All Valve Spring Compressor

damage. Ease of operation through the reduction of friction is secured because of the roller bearing fittings in the head.

Two removable shoes are furnished to accommodate valves of the split-washer or cotter pin type. The extra shoe is snapped on the handle. The price is \$6.75 net.

### Victor Pump

This pump is offered by the Judd & Leland Mfg. Co., Clifton Springs, N. Y., as very applicable in connection with large size tires used on the ordinary speed truck.



This Tripple Barreled Victor Pump is Offered as Especially Suitable for Speed Truck Use.

### Sprite Valve and Valve Seat Grinder

The Threm & Davis Co., 1514 Oakwood Ave., Toledo, O., in offering its Sprite valve and valve seat grinder is offering a tool that is claimed to grind the valves



Sprite Valve and Valve Seat Grinder

and the valve seats with equal facility. Labor and time consumed in work performed on this machine is satisfactorily low. The outfit comes complete with a motor and diamond point emery wheel dresser.

### Fort Hill Aligning Gage

Three features of merit are emphasized by the Dyer Co., Cambridge, Mass., in a description of its recently developed piston and connecting rod aligning gage. First, the device operates with but one arbor for all sizes and types of rods. Second, is its micrometer accuracy, which is guaranteed and which can be readily tested by the operator. Third, is that it has but one moving part. This is a feature in construction which is contributory to its accuracy. The list price is \$25.

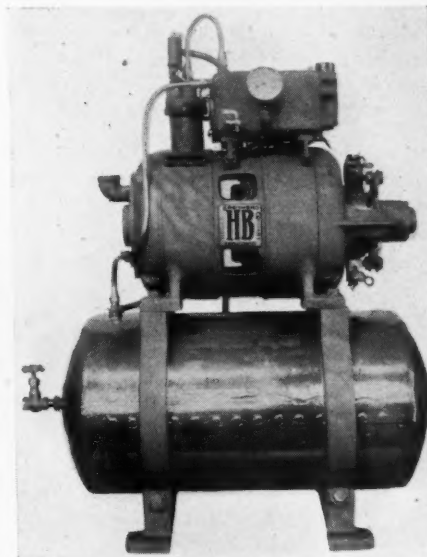


Fort Hill Piston and Connecting Rod Aligning Gage

### HB Automatic Air Compressor

A new Automatic Air Pressure Pump featured because of its mounting on its own tank and magnetic pressure is being offered to the trade by the Hobart Bros. Co., Troy, O. It is guaranteed to maintain a constant air pressure at all times, day and night, on all air lines, once the outfit is properly installed.

The outfit is compact, yet of ample capacity for service station use. The exclusive feature, the magneto pressure release, enables the engine to start without load, which is said not only to conserve



HB Automatic Air Compressor and Tank

current but to make starting instantaneous. Gearless, ball bearing, automatic and quiet operation describes the other features of this compressor.

The low speed ball bearing compressor or type motor is built directly in the pump, the motor shaft being the part of the pump shaft, making the motor and pump one compact unit. Air and oil filler, safety gage and tank are all standard equipment. Power for operating is secured from either lighting or power lines.

The compact size of this outfit, the makers point out, makes it desirable for oil service stations where space is limited.

### Victor Jack

An addition to the line of the Walker Mfg. Co., Racine, Wis., are the Victor and Victor Junior jacks. The illustration shown herewith, is that of the Victor jack.



Easy Lift is Said to be Provided by this Jack by Reason of Short Handle Stroke.

The Victor jack is strong, compactly built and light. The rack of this jack is cast with a lifting foot which is great convenience in the event front and rear wheels are of unequal heights or resting on uneven surfaces.

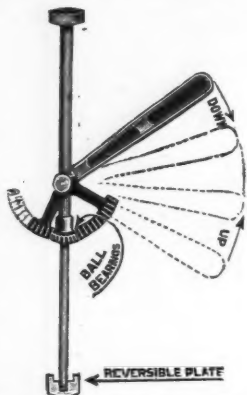
Easy lift is said to be secured from a short handle stroke construction providing great leverage.

The Junior model weighs 4½ lb. and is capable of lifting ¾ of a ton.

### Royal Valve Grinder

A great saving of energy together with an accurate seating valve are said to be the advantages derived from the long shank and long handle construction of the manually operated Royal Valve Grinder offered by the Universal Equipment & Supply Co., Syracuse, N. Y.

The finishing up of a grinding operation is accomplished by using a full stroke or any part thereof (note the illustration),



This Illustration Explains the Principle Involved in the Operation of the Royal Valve Grinder

thus grinding with an oscillating motion on anything from ¼ to 1½ turns. Shifting from any part of a turn to another is accomplished by raising or lowering the handle.

The handle provides a leverage of 5 to 1, and the valve spring furnished with each grinder raises the valve for inspection, etc., when the hand is removed.

### Katy Kottter Puller

A tool that facilitates and simplifies the removal of cotter pins from connecting rods, is being marketed by the Katy Mfg. Co., 908 East Lake St., Minneapolis, Minn.

It takes a secure hold on the pin, removing it with little effort. This tool is made from drop forged steel and is tempered and polished. The list price is \$1.40.



Extracting a Pin With the Katy Kottter Puller

### Valley Electric Buffer and Grinder

A machine that is particularly adapted for service in tire, repair and machine shops for such operations as buffing, grinding and polishing is being offered by the Valley Electric Co., 3157 S. Kingshighway, St. Louis, Mo.

The motor is mounted on a rigid cast-iron pedestal, which is lagged to the floor through three holes provided in the base. The solid construction of the pedestal is claimed to eliminate vibration.

The entire machine, which includes two principal parts, the motor and stand, is finished in black enamel. The motor, which is of dust-proof construction, is



Valley Electric Buffer and Grinder

stated to have a reserve capacity of power. The end plates are solid, and the bearings are SKF make, of the ball, double row, self-cleaning type.

Each machine has a double shaft threaded on both ends, one end having two 4-in. flanges and nut for holding the wheel, and the other a nut for holding the brush.

### New Black & Decker Light Quarter-Inch Drill

The Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., builder of portable electric tools, has announced a new light weight quarter-inch portable electric drill, designed for drilling in metal or wood. It can also be used as a grinder if mounted on a base, which is supplied as extra, together with clamp washers and a grinding wheel.

This drill has an aluminum alloy housing and weighs five pounds. It has double reduction gearing, giving a no load speed of 1600 r.p.m. It is similar in all respects to the rest of the Black & Decker line.

All bearings are removable and renewable and this drill is equipped with a spe-

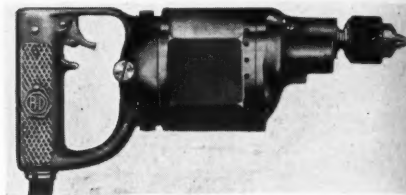
cial "Pistol Grip and Trigger Switch," with the switch mechanism arranged in the "grip."

The drill mechanism is particularly accessible. The brushes can be renewed from the outside of the case. By removing four screws the motor commutator, switch mechanism, field leads and cord terminals may be entirely exposed.

The commutator end bearing of the motor armature is carried in a spider, which is integral with the motor case, making it impossible for the armature to get out of alignment and making it possible to inspect the commutator and clean it while the drill is running.

A special rubber covered cable is supplied and a clamp is provided in "the pistol grip," so that strains on the cable have no tendency to pull the terminals loose from the switch. Cable conductors are attached to the switch block by screw terminals.

This new unit is supplied complete with three jaw chuck, flexible cord and attach-



New B. & D. Light Quarter-Inch Drill

ment plug at \$39 net list east of Denver, and \$39.50 for Denver and west. The grinding equipment is supplied at \$2 extra.

### Fuller Announces Improvement in its Transmission

Fuller transmissions are now furnished with the clutch throwout bearing automatically lubricated by the oil from the transmission according to a recently received report from Fuller and Sons Mfg. Co., Kalamazoo, Mich. This has been carefully worked out so just the right amount of oil is supplied.

### Necessity Chain Tool

"Tiger" jaws is the term used by the Stevens & Co., 375 Broadway, New York City, in explaining the quick and sure action of its chain tool. The tool was designed for a specific purpose: for opening and closing cross chain hooks.

It is made from a drop forging. It is 9 in. long, and has large and easy gripping handles. The list price is \$1.60. In Canada, \$2.50.



Showing Manner in Which Links Are Opened and Closed by "Necessity" Chain Tool



# Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R-1—1920	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB-1 1/2—1920	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason H-2 1/2—1920	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason L-3 1/2—1920	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason M-5—1920	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Ac, Series A 1 1/2—1920	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Ac, Series A2 1/2—1919-20	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2 1/2	6 1/2	2 1/2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acme G-1/4	3	1 1/4	1 1/4	1 1/4	H	11	2	11	2	38 1/2	1 1/4	F	12	3	1/4	2	12	3	1/4	2	110 1/2	34
Acme B-1—1916-20	3	1 1/4	1 1/4	1 1/4	H	11	2	11	2	38 1/2	1 1/4	F	12	3	1/4	2	12	3	1/4	2	110 1/2	34
Acme F-1 1/2—1919-20	3	1 1/4	1 1/4	1 1/4	H	11	2	11	2	38 1/2	1 1/4	F	12	3	1/4	2	12	3	1/4	2	110 1/2	34
Acme A-2—1916-20	3	1 1/4	1 1/4	1 1/4	H	8	1 1/2	11	1 1/2	40	1 1/4	F	12	3	1/4	4	12	3	1/4	4	123 1/2	34
Acme AC-2 1/2—1921	3	1 1/4	1 1/4	1 1/4	H	12	1 1/2	8	1 1/2	33 1/2	1 1/4	F	13	3 1/2	3/4	4	13	3 1/2	3/4	4	140 1/2	34
Acme C-3 1/2—1917-20	3	1 1/4	1 1/4	1 1/4	H	11 1/2	1 1/2	8	1 1/2	33 1/2	1 1/4	F	13	3 1/2	3/4	4	13	3 1/2	3/4	4	150 1/2	36
Acme E-5—1919-20	3	1 1/4	1 1/4	1 1/4	H	11	2	14	2	40 1/2	1 1/4	F	18	4	1/2	4	18	4	1/2	4	159 1/2	37
Akron Multi-Truck 20-1 1/2	3	1 1/4	1 1/4	1 1/4	H	9	1 1/2	7 1/2	1 1/2	36 1/2	1 1/4	F	19 1/2	1 1/2	1/4	4	19 1/2	1 1/2	1/4	4	102	34
American 25-2 1/2	4	1 1/4	1 1/4	1 1/4	V	19	1 1/2	17	1 1/2	38	2	F	19	2 1/2	1/4	4	19	2 1/2	1/4	4	142	33
American 40-4	4	1 1/4	1 1/4	1 1/4	V	19	1 1/2	17	1 1/2	38	2	F	19	2 1/2	1/4	4	19	2 1/2	1/4	4	142	33
American 50-5	4	1 1/4	1 1/4	1 1/4	V	19	1 1/2	17	1 1/2	38	2	F	19	2 1/2	1/4	4	19	2 1/2	1/4	4	142	33
Apex C-1	3	1 1/4	1 1/4	1 1/4	V	7 1/2	2	12	2	36 1/2	1 1/4	F	42	2	1/4	2	41 1/2	2	1/4	2	102	35 1/2
Apex D-1 1/2	3	1 1/4	1 1/4	1 1/4	V	7 1/2	2	12	2	36 1/2	1 1/4	F	42	2	1/4	2	41 1/2	2	1/4	2	102	35 1/2
Apex E-2 1/2	4	1 1/4	1 1/4	1 1/4	V	7 1/2	2	12	2	36 1/2	1 1/4	F	42	2	1/4	2	41 1/2	2	1/4	2	102	35 1/2
Apex G	3	1 1/4	1 1/4	1 1/4	V	12	2	15 1/2	2	34 1/2	1 1/4	F	42	2	1/4	2	41 1/2	2	1/4	2	102	35 1/2
Armleder 20	4	1 1/4	1 1/4	1 1/4	V	12 1/2	2	16 1/2	2	31 1/2	2	F	11 1/2	3 1/4	1/4	4	11 1/2	3 1/4	1/4	4	104 1/2	32
Armleder KW-3 1/2—1916-21	4	1 1/4	1 1/4	1 1/4	V	12 1/2	2	16 1/2	2	31 1/2	2	F	11 1/2	3 1/4	1/4	4	11 1/2	3 1/4	1/4	4	104 1/2	32
Armleder HW-2 1/2—1916-21	4	1 1/4	1 1/4	1 1/4	V	10	1 1/2	11 1/2	1 1/2	34	2	F	13 1/4	3 1/4	1/4	4	13 1/4	3 1/4	1/4	4	140	32
Atco B-1 1/2	4	1 1/4	1 1/4	1 1/4	V	11	2	11	2	31 1/2	2	F	25 1/2	2 1/2	1/4	4	18	2 1/2	1/4	4	109 1/2	32
Atco B1-1 1/2	4	1 1/4	1 1/4	1 1/4	V	11	2	11	2	31 1/2	2	F	25 1/2	2 1/2	1/4	4	18	2 1/2	1/4	4	109 1/2	32
Atco A-2 1/2	4	1 1/4	1 1/4	1 1/4	V	12	2	11	2	33 1/2	1 1/4	F	25 1/2	2 1/2	1/4	4	18	2 1/2	1/4	4	124 1/2	33
Atlas 21-1	3	1 1/4	1 1/4	1 1/4	H	9	2	14 1/2	2	31 1/2	1 1/4	F	40	2 1/2	1/4	1	22 1/2	2 1/2	1/4	1	84 1/2	33 1/2
Atterbury 20R-1 1/2—1920	4	1 1/4	1 1/4	1 1/4	V	8	1 1/2	14	1 1/2	38 1/2	1 1/4	F	11 1/2	3 1/4	1/4	4	11 1/2	3 1/4	1/4	4	122 1/2	34
Atterbury 7CX-2 1/2—1919-20	4	1 1/4	1 1/4	1 1/4	V	5 1/2	1 1/2	6 1/2	1 1/2	30 1/2	1 1/4	F	13 1/4	3 1/4	1/4	4	13 1/4	3 1/4	1/4	4	133 1/2	34
Atterbury 7D-3 1/2—1917-20	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	6	1 1/2	30 1/2	1 1/4	F	15 1/4	3 1/4	1/4	4	15 1/4	3 1/4	1/4	4	145 1/2	37 1/2
Atterbury 8E-5—1919-20	3	1 1/4	1 1/4	1 1/4	V	14	2	20 1/2	2	40	2	F	17 1/4	4	1/4	4	17 1/4	4	1/4	4	157 1/2	37 1/2
Autocar XXI-F-2—1915-20	4	1 1/4	1 1/4	1 1/4	V	3	1 1/4	4	1 1/4	40	1 1/4	F	16 1/4	2 1/2	1/4	4	13	2 1/2	1/4	4	91	34
Autocar XXI-G-2—1920	4	1 1/4	1 1/4	1 1/4	V	3	1 1/4	4	1 1/4	40	1 1/4	F	16 1/4	2 1/2	1/4	4	13	2 1/2	1/4	4	114	34
Autocar XXVI-Y-4—1920	3	1 1/4	1 1/4	1 1/4	V	3 1/2	1 1/2	3	1 1/2	48 1/2	1 1/4	F	25 1/2	2 1/2	1/4	4	25 1/2	2 1/2	1/4	4	121	34 1/2
Autocar XXVI-B-4—1920	3	1 1/4	1 1/4	1 1/4	V	3 1/2	1 1/2	3	1 1/2	48 1/2	1 1/4	F	25 1/2	2 1/2	1/4	4	25 1/2	2 1/2	1/4	4	176	34 1/2
Available H-1 1/2—1920	4	1 1/4	1 1/4	1 1/4	V	11	1 1/2	14	1 1/2	40	2	F	48	2 1/2	1/4	2	36	2 1/2	1/4	2	120	32
Available H-2 1/2—1916-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	14	1 1/2	40	2	F	13 1/4	3 1/4	1/4	4	13 1/4	3 1/4	1/4	4	144	32
Available H3—1916-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	14	1 1/2	42	2	F	16	3 1/4	1/4	4	16	3 1/4	1/4	4	168	36
Available H5—1916-20	3	1 1/4	1 1/4	1 1/4	V	12	2	16	2	40	2	F	18	4	1/4	4	18	4	1/4	4	168	38
Available H7—1919-20	3	1 1/4	1 1/4	1 1/4	V	12	2	16	2	40	2	F	72	3 1/2	1/4	2	72	3 1/2	1/4	2	168	38
Available H2—1921	4	1 1/4	1 1/4	1 1/4	V	12	1 1/2	14	1 1/2	40	2	F	48	2 1/2	1/4	2	36	2 1/2	1/4	2	120	32
Available H2 1/2—1921	4	1 1/4	1 1/4	1 1/4	V	12	1 1/2	14	1 1/2	40	2	F	13 1/4	3 1/4	1/4	4	13 1/4	3 1/4	1/4	4	144	32
Available H3 1/2—1921	4	1 1/4	1 1/4	1 1/4	V	12	1 1/2	14	1 1/2	42	2	F	16	3 1/4	1/4	4	16	3 1/4	1/4	4	168	36
Available H5—1921	4	1 1/4	1 1/4	1 1/4	V	12	2	16	2	40	2	F	18	4	1/4	4	18	4	1/4	4	168	38
Available H7—1921	4	1 1/4	1 1/4	1 1/4	V	12	2	16	2	40	2	F	72	3 1/2	1/4	2	72	3 1/2	1/4	2	168	38
Avery 1—1920	3	1 1/4	1 1/4	1 1/4	V	10	2	6 1/2	2	31 1/2	1 1/4	F	19 1/2	2	1/4	4	18 1/2	2	1/4	4	85	34
Beck-Hawkeye A-1—1913-20	3	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/2	32	2	F	24	2 1/2	1/4	1	24	2 1/2	1/4	1	114	34
Beck-Hawkeye B-1 1/2—1912-20	3	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/2	32	2	F	24	2 1/2	1/4	1	24	2 1/2	1/4	1	114	34
Beck-Hawkeye C-2—1912-20	3	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/2	32	2	F	24	2 1/2	1/4	1	24	2 1/2	1/4	1	114	34
Beck-Hawkeye D-3—1920	3	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/2	32	2	F	24	2 1/2	1/4	1	24	2 1/2	1/4	1	114	34
Bell M1	4	1 1/4	1 1/4	1 1/4	V	10	2															

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency			Length	Width			
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Collier 21-2—1918-20.	3	1 1/2	1 1/2	1 1/2	V	6	1 1/2	10 1/2	1 1/2	40	1	F	27 1/2	3 1/2	1/4	4	27 1/2	3 1/2	1/4	4	132	32
Collier 22-2 1/2—1919-20.	3	1 1/2	1 1/2	1 1/2	V	6	1 1/2	10 1/2	1 1/2	40	1	F	27 1/2	3 1/2	1/4	4	27 1/2	3 1/2	1/4	4	144	32
Columbia G-2 1/2—1921.	3	1 1/2	1 1/2	1 1/2	V	11	1 1/2	10	1 1/2	38	1 1/2	F	55	3	1/4	2	50	2	1/4	2	132	32 1/2
Commerce T-1500.	3	1 1/2	1 1/2	1 1/2	V	10	2 1/2	10	2 1/2	44	1 1/2	V	50	2 1/2	1/4	2	48 1/2	2 1/2	1/4	2	92 1/2	34
Commerce 12-3000.	3	1 1/2	1 1/2	1 1/2	V	10	2 1/2	10	2 1/2	44	1 1/2	V	45	2 1/2	1/4	2	43	2 1/2	1/4	2	99 1/2	34
Commerce 16-4000.	3	1 1/2	1 1/2	1 1/2	V	10	2 1/2	10	2 1/2	44	1 1/2	V	45	2 1/2	1/4	2	43	2 1/2	1/4	2	108 1/2	34
Commerce 18-5000.	3	1 1/2	1 1/2	1 1/2	V	6	1 1/2	11	1 1/2	33	1 1/2	V	50 1/2	2 1/2	1/4	2	48	2 1/2	1/4	2	128 1/2	34
Concord A-2—1921.	4	1 1/2	1 1/2	1 1/2	H	11	2 1/2	9 1/2	1 1/2	34	2	F	12	3 1/2	1/4	4	12	3 1/2	1/4	4	108 1/2	32 1/2
Concord AX-2—1921.	4	1 1/2	1 1/2	1 1/2	H	11	2 1/2	9 1/2	1 1/2	34	2	F	12	3 1/2	1/4	4	12	3 1/2	1/4	4	122 1/2	32 1/2
Concord B-3—1921.	4	1 1/2	1 1/2	1 1/2	H	11	2 1/2	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	122 1/2	32 1/2
Concord BX-3—1921.	4	1 1/2	1 1/2	1 1/2	H	11	2 1/2	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	155 1/2	32 1/2
Corbitt E-1—1917-20.	3	1 1/2	1 1/2	1 1/2	V	8	2 1/2	14	2 1/2	38	1 1/2	V	19	2	1/4	2	19	2	1/4	2	105	34
Corbitt D-1 1/2—1916-20.	3	1 1/2	1 1/2	1 1/2	V	8	2 1/2	14	2 1/2	38	1 1/2	V	45 1/2	2 1/2	1/4	2	45 1/2	2 1/2	1/4	2	120	34
Corbitt C-2—1915-20.	3	1 1/2	1 1/2	1 1/2	V	14	1 1/2	13	1 1/2	36	1 1/2	F	51 1/2	2 1/2	1/4	1	51 1/2	2 1/2	1/4	1	138	35
Corbitt B-2 1/2—1916-20.	3	1 1/2	1 1/2	1 1/2	V	14	1 1/2	13	1 1/2	36	1 1/2	F	51 1/2	2 1/2	1/4	1	51 1/2	2 1/2	1/4	1	138	35
Corbitt AA-5—1919-20.	3	1 1/2	1 1/2	1 1/2	V	13	1 1/2	8	1 1/2	36	2	V	69 1/2	3	1/4	1	69 1/2	3	1/4	1	160	38
Corbitt A-3 1/2—1917-20.	3	1 1/2	1 1/2	1 1/2	V	13	2	14	2	36	1 1/2	V	64	2 1/2	1/4	1	64	2 1/2	1/4	1	160	38
Cyclone A-3000.	3	1 1/2	1 1/2	1 1/2	V	16	2	16	2	32 1/2	1 1/2	F	21 1/2	1 1/2	1/4	4	19 1/2	1 1/2	1/4	4	113	34
Dart H-1—1920-21.	3	1 1/2	1 1/2	1 1/2	H	11	2	8	1 1/2	36	1	F	19	1 1/2	1/4	4	19	1 1/2	1/4	4	102	34
Dart S-1 1/2—1920-21.	3	1 1/2	1 1/2	1 1/2	H	11	2	8	1 1/2	36	1	F	19	1 1/2	1/4	4	19	1 1/2	1/4	4	112	34
Dart M-2 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	H	11	2	14	1 1/2	35	2	F	10	2 1/2	1/4	2	19	3 1/2	1/4	2	124	34
Dart W-3 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	H	11	2	12	1 1/2	36	2	F	28	2 1/2	1/4	4	28	2 1/2	1/4	4	144	38
Day-Elder A-1.	3	1 1/2	1 1/2	1 1/2	V	9	2	9 1/2	2	40	1 1/2	V	19	2	1/4	4	19	2	1/4	4	108	35
Day-Elder B-1 1/2.	3	1 1/2	1 1/2	1 1/2	V	9	2	9 1/2	2	40	1 1/2	V	45	2	1/4	4	45	2	1/4	4	120	35
Day-Elder D-2.	3	1 1/2	1 1/2	1 1/2	V	4	1 1/2	9	1 1/2	35	2	V	52	2 1/2	1/4	2	52	2 1/2	1/4	2	123	35
Day-Elder C-2 1/2.	4	1 1/2	1 1/2	1 1/2	V	10 1/2	2	12	1 1/2	36 1/2	2	F	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	148	35
Day-Elder F-3 1/2.	3	1 1/2	1 1/2	1 1/2	V	12 1/2	2	10	1 1/2	38 1/2	1 1/2	F	69	3	1/4	2	69	3	1/4	2	155	37
Day-Elder E-5.	3	1 1/2	1 1/2	1 1/2	V	12 1/2	2	10	1 1/2	37	1	F	18	2 1/2	1/4	2	18	2 1/2	1/4	2	130	32
Dearborn BW-2—1915-17-19-20.	3	1 1/2	1 1/2	1 1/2	V	8 1/2	2	6	1 1/2	37	1	F	16 1/2	2 1/2	1/4	2	16 1/2	2 1/2	1/4	2	96 1/2	34
Dearborn F-1 1/2—1915-17-19-20.	3	1 1/2	1 1/2	1 1/2	V	12	2	8	1 1/2	37	1	F	38	2	1/4	1	38	2	1/4	1	107	32
Dearborn C-1—1915-17-19-20.	3	1 1/2	1 1/2	1 1/2	V	10	2	8	1 1/2	40 1/2	1 1/2	F	45	2 1/2	1/4	1	43 1/2	2 1/2	1/4	1	116	34
Defiance B-1 1/2—1918-19-20.	3	1 1/2	1 1/2	1 1/2	V	10	2	8	1 1/2	40 1/2	1 1/2	F	54 1/2	2 1/2	1/4	1	52 1/2	2 1/2	1/4	1	116	34
Defiance C-2—1918-19-20.	3	1 1/2	1 1/2	1 1/2	V	10	2	8 1/2	1 1/2	40 1/2	1 1/2	F	45	2 1/2	1/4	1	43 1/2	2 1/2	1/4	1	120	34
Defiance D—1920-21.	3	1 1/2	1 1/2	1 1/2	V	10	2	8 1/2	1 1/2	40 1/2	1 1/2	F	54 1/2	2 1/2	1/4	1	52 1/2	2 1/2	1/4	1	120	34
Defiance E—1920-21.	3	1 1/2	1 1/2	1 1/2	V	10	2	8 1/2	1 1/2	40 1/2	1 1/2	F	49	2 1/2	1/4	2	47 1/2	2 1/2	1/4	2	120	34
Denby 31-1 1/2—1921.	3	1 1/2	1 1/2	1 1/2	V	6	2 1/2	19	2 1/2	38 1/2	1 1/2	F	49	2 1/2	1/4	2	46 1/2	2 1/2	1/4	2	97 1/2	34
Denby 33-1 1/2—1921.	3	1 1/2	1 1/2	1 1/2	V	12	2	9	2	42	1 1/2	V	8 1/2	4	1/4	2	47 1/2	1 1/2	1/4	2	120	33 1/2
Denby 134-2—1921.	3	1 1/2	1 1/2	1 1/2	V	12	2	9	2	42	1 1/2	V	53 1/2	3	1/4	2	50 1/2	2	1/4	2	127	34
Denby 25-3—1921.	3	1 1/2	1 1/2	1 1/2	V	12	2	9	2	35	1 1/2	F	56 1/2	3	1/4	2	47 1/2	2	1/4	2	127	34
Denby 27-4—1921.	3	1 1/2	1 1/2	1 1/2	V	13	1 1/2	16 1/2	1 1/2	39 1/2	1 1/2	F	8 1/2	4	1/4	2	58	2 1/2	1/4	2	140	34
Denby 210-5—1921.	3	1 1/2	1 1/2	1 1/2	V	13	1 1/2	16 1/2	1 1/2	39 1/2	1 1/2	F	8 1/2	4	1/4	2	58	2 1/2	1/4	2	140	34
Dependable Dispatch A-1 1921.	4	1 1/2	1 1/2	1 1/2	V	14	2 1/2	15	1 1/2	37 1/2	2	F	53 1/2	2 1/2	1/4	1	38 1/2	2 1/2	1/4	1	108	33 1/2
Dependable C-1 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	V	14	2 1/2	15	1 1/2	37 1/2	2	F	53 1/2	2 1/2	1/4	1	38 1/2	2 1/2	1/4	1	121	33
Dependable D-2 1920-21.	4	1 1/2	1 1/2	1 1/2	V	10	2 1/2	11 1/2	1 1/2	37 1/2	2	F	53 1/2	2 1/2	1/4	1	38 1/2	2 1/2	1/4	1	140	33
Dependable E-2 1/2—1920-21.	4	1 1/2	1 1/2	1 1/2	V	10	2 1/2	11 1/2	1 1/2	37 1/2	2	F	63	2 1/2	1/4	1	49	2 1/2	1/4	1	152	33
Dependable G-3 1/2 1921.	4	1 1/2	1 1/2	1 1/2	V	13	2	13	1 1/2	37 1/2	2	F	63	2 1/2	1/4	1	49	2 1/2	1/4	1	170	33
Diamond T-O-3-1.	3	1 1/2	1 1/2	1 1/2	V	9	1 1/2	6	1 1/2	35	2	F	48	2 1/2	1/4	2	33	2 1/2	1/4	2	100	34
Diamond T-FS&T-1 1/2.	3	1 1/2	1 1/2	1 1/2	V	9	1 1/2	6	1 1/2	35	2	F	11 1/2	3 1/2	1/4	4	11 1/2	3 1/2	1/4	4	Opt	34
Diamond T-U-2.	3	1 1/2	1 1/2	1 1/2	V	9	1 1/2	6	1 1/2	35	2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	Opt	34
Diamond TK-3 1/2.	3	1 1																				



## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency				Length	Width		
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Globe D-20.....	3	1 1/4	1 1/4	1 1/4	V	8 3/4	1 1/4	8 3/4	1 1/4	33 3/4	1 1/4	V	21	2 1/4	1 1/4	1	23 1/4	2 1/4	1 1/4	1	75	33 1/4
G.M.C. K-15.....	4	1 1/4	1 1/4	1 1/4	V	8 3/4	1 1/4	8 3/4	1 1/4	33 3/4	1 1/4	V	49 1/2	2 1/4	1 1/4	1	47	2 1/4	1 1/4	1	89	31
G.M.C. K-16.....	4	1 1/4	1 1/4	1 1/4	V	8 3/4	1 1/4	8 3/4	1 1/4	33 3/4	1 1/4	V	49 1/2	2 1/4	1 1/4	1	47	2 1/4	1 1/4	1	89	31
G.M.C. K-41.....	4	1 1/4	1 1/4	1 1/4	V	10 1/4	1 1/4	9 1/2	1 1/4	37 1/4	1 1/4	V	13	3 1/4	1 1/4	4	13	3 1/4	1 1/4	4	Opt	33
G.M.C. K-41.....	4	1 1/4	1 1/4	1 1/4	V	10 1/4	1 1/4	9 1/2	1 1/4	37 1/4	1 1/4	V	15 1/4	3 1/4	1 1/4	4	15 1/4	3 1/4	1 1/4	4	Opt	38
G.M.C. K-71.....	4	1 1/4	1 1/4	1 1/4	V	11 1/4	1 1/4	9 1/2	1 1/4	37 1/4	1 1/4	V	17 1/4	3 1/4	1 1/4	4	17 1/4	3 1/4	1 1/4	4	Opt	38
G.M.C. K-101.....	4	1 1/4	1 1/4	1 1/4	V	11 1/4	1 1/4	9 1/2	1 1/4	37 1/4	1 1/4	V	54 1/4	2 1/4	1 1/4	2	21 1/4	2 1/4	1 1/4	2	119 1/2	34
Gove A-1-2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	5	4			64	1 1/4	F	21	2 1/4	1 1/4	2	21	2 1/4	1 1/4	2	140 1/2	33
Graham A.....	3	1 1/4	1 1/4	1 1/4	V	5	4			64	1 1/4	F	21	2 1/4	1 1/4	2	21	2 1/4	1 1/4	2	97	30
Gramm-Bernstein 10 Speed—1921.....	3	1 1/4	1 1/4	1 1/4	H	10 1/4	2	6	2	39	1 1/4	F	48 1/2	2 1/4	1 1/4	2	45 1/2	1 1/4	1 1/4	2	120	32
Gramm-Bernstein 15-1 1/2—1921.....	3	1 1/4	1 1/4	1 1/4	H	10 1/4	2	6	2	39	1 1/4	F	19 1/4	1 1/4	1 1/4	4	19 1/4	1 1/4	1 1/4	4	120	32
Gramm-Bernstein 65-1 1/2—1921.....	3	1 1/4	1 1/4	1 1/4	V	10 1/4	1 1/2	12	1 1/2	32	2	F	45	2 1/4	1 1/4	4	45	2 1/4	1 1/4	4	126	32 1/4
Gramm-Bernstein 20-2—1921.....	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1 1/4	4	22 3/4	2 1/4	1 1/4	4	129 3/4	36
Gramm-Bernstein 25-2 1/4—1921.....	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1 1/4	4	22 3/4	2 1/4	1 1/4	4	129 3/4	36
Gramm-Bernstein 30—1921.....	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	9	1 1/2	33 3/4	2	F	28 3/4	2 1/4	1 1/4	4	28 3/4	2 1/4	1 1/4	4	144	36
Gramm-Bernstein 35-3 1/4—1921.....	3	1 1/4	1 1/4	1 1/4	V	23 1/4	2	13 1/2	2	40 3/4	1 1/4	F	32 1/2	2 1/4	1 1/4	4	32 1/2	2 1/4	1 1/4	4	162	36
Gramm-Bernstein 50-5—1921.....	3	1 1/4	1 1/4	1 1/4	V	23 1/4	2	13 1/2	2	40 3/4	1 1/4	F	49	2 1/4	1 1/4	4	47	1 1/2	1 1/2	4	89	32
G. W. W.....	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	11	1 1/4	37	2	F	11 1/2	3	1 1/4	4	11 1/2	3	1 1/4	4	144	38
Hall 2-Worm-2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	8	1 1/4	15 1/2	1 1/4	38 1/2	1 1/4	F	15	3 1/4	1 1/4	4	15	3 1/4	1 1/4	4	180	39
Hall 3 1/2-Worm.....	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/2	1 1/4	F	18	4	1 1/4	4	18	4	1 1/4	4	144	39
Hall 5-Worm.....	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/2	1 1/4	F	18	4	1 1/4	4	18	4	1 1/4	4	144	39
Hall 7-Chain.....	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	15 1/2	1 1/4	38 1/2	1 1/4	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	Opt	32 1/4
Hendrickson 1-2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	16	3 1/4						16	3 1/4	1 1/4	4	16	3 1/4	1 1/4	4	Opt	36
Hendrickson J-3 1/2.....	3	1 1/4	1 1/4	1 1/4	V	18	4						18	4	1 1/4	4	18	4	1 1/4	4	Opt	38
Hendrickson K-5.....	3	1 1/4	1 1/4	1 1/4	V	57	2 1/2						69	3	1 1/4	2	57	2 1/2	1 1/4	2	147	38
Highway Knight A.....	3	1 1/4	1 1/4	1 1/4	V	14	2 3/4	10	2 3/4	53	5/8	V	12	1 1/2	1 1/4	2	12	1 1/2	1 1/4	2	85	32
Highway Knight B-5.....	3	1 1/4	1 1/4	1 1/4	V	14	2 3/4	7	2	32	1 1/2	R	18	2	1 1/4	2	18	2	1 1/4	2	100	32
Higra A18-1—1918-19.....	3	1 1/4	1 1/4	1 1/4	V	9	2	7	2	32	1 1/2	R	24	2	1 1/4	1	46	3	1 1/4	2	120	30
Higra B20-1 1/2—1919-20.....	3	1 1/4	1 1/4	1 1/4	V	9	2	7	2	32	1 1/2	R	44	2 1/2	1 1/4	2	44	2 1/2	1 1/4	2	123	32
Holmes 4WD-2.....	3	1 1/4	1 1/4	1 1/4	V	17	1 1/4	14	1 1/4	38 1/4	1 1/4	F	46	2 1/2	1 1/4	2	44	2 1/2	1 1/4	2	123	32
Huffman B-1 1/2—1919-20.....	3	1 1/4	1 1/4	1 1/4	V	22	2						22	2	1 1/4	2	22	2	1 1/4	2	132	35 1/4
Huffman C-1 1/2—1919-20.....	3	1 1/4	1 1/4	1 1/4	V	24	2 1/2						22	2	1 1/4	2	23	2 1/2	1 1/4	2	154	34
Hurlburt A1 1/2-2.....	3	1 1/4	1 1/4	1 1/4	V	26	3						24	2 1/2	1 1/4	2	25	3	1 1/4	2	144 1/2	34
Hurlburt B2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	28	3						26	3	1 1/4	2	27	3	1 1/4	2	144 1/2	34
Hurlburt C3 1/2-4.....	3	1 1/4	1 1/4	1 1/4	V	15	3						28	3	1 1/4	2	50	2	1 1/4	2	121	33
Hurlburt D5-5 1/2.....	3	1 1/4	1 1/4	1 1/4	V	15	3						15	3	1 1/4	2	50	2 1/2	1 1/4	2	145	33
Huron-Erie 1 1/2.....	4	1 1/4	1 1/4	1 1/4	V	17 1/2	1 1/4	14	1 1/4	38 1/4	1 1/4	F	44	2 1/2	1 1/4	2	44	2 1/2	1 1/4	2	108	32
Huron-Michigan 2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	51	2 1/4	1 1/4	2	51	2 1/4	1 1/4	2	126	33
Indiana 12-1 1/2—1921.....	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	56	2 1/2	1 1/4	2	56	2 1/2	1 1/4	2	138	33
Indiana 20-2—1921.....	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	68	3	1 1/4	2	68	3	1 1/4	2	144	34 1/4
Indiana 25-2 1/2—1921.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	17 1/2	1 1/4	26 1/2	1 1/4	F	38	2	1 1/4	2	36	2	1 1/4	2	156	37 1/4
Indiana 35-3 1/2—1921.....	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	43 3/4	2 1/4	1 1/4	2	43 3/4	2 1/4	1 1/4	2	90	34
Indiana 51-5—1921.....	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	43 3/4	2 1/4	1 1/4	2	43 3/4	2 1/4	1 1/4	2	75 1/2	34
International S-1500 lbs.—Speed Truck '21.....	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	43 3/4	2 1/4	1 1/4	2	43 3/4	2 1/4	1 1/4	2	88 1/2	34
International 21-2000 lbs.—1916-21.....	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	14 1/2	2				50 1/2	2 1/4	1 1/4	2	50 1/2	2 1/4	1 1/4	2	91 1/2	34
International 31-3000 lbs.—1916-21.....	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	14 1/2	2				50 1/2	2 1/4	1 1/4	2	50 1/2	2 1/4	1 1/4	2	118 1/2	34
International 41-4000 lbs.—1918-21.....	4	1 1/4	1 1/4	1 1/4	V	9	1 1/4	14 1/2	2				73	2 1/2	1 1/4	2	73	2 1/2	1 1/4	2	147 1/2	34
International 61-6000 lbs.—1918-21.....	4	1 1/4	1 1/4	1 1/4	V	11	1 1/4	14 1/2	2				58 1/2	3 1/2	1 1/4	2	58 1/2	3 1/2	1 1/4	2	150	36
International 101-10,000 lbs.—1920-21.....	4	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/4	18	1 1/4	33 3/4	2	F										

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Maccar H-2, 2 1/2—1921	4	1 1/2	1 1/2	1 1/2	V	9 1/2	1 1/2	15 1/2	1 1/2	41 1/2	1 1/2	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	143 1/2	34
Maccar HA 1921	4	1 1/2	1 1/2	1 1/2	V	11 1/2	1 1/2	17	1 1/2	41 1/2	1 1/2	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	143 1/2	34
Maccar M2-3 1/2—1920	3	1 1/2	1 1/2	1 1/2	V	8	1 1/2	13 1/2	1 1/2	37 1/2	2	F	15 1/2	3 1/2	1/4	4	15 1/2	3 1/2	1/4	4	155 1/2	34
Maccar G-5—1919-20	3	1 1/2	1 1/2	1 1/2	V	10 1/2	2	20 1/2	2	40 1/2	2	F	17 1/2	4	1/4	4	17 1/2	4	1/4	4	167	37 1/2
MacDonald A-7 1/2	4	1 1/2	1 1/2	1 1/2	V	12	2	21	1 1/2	35	2	F	70	3	1/4	3	34	3	1/4	1	167	37 1/2
Mack AB1 1/2, 2, 2 1/2-Ton-Chain '16-20	4	1 1/2	1 1/2	1 1/2	V	9 1/2	1 1/2	15 1/2	1 1/2	33	1 1/2	F	12 1/2	3 1/2	1/4	2	16 1/2	2 1/2	1/4	2	Opt	33 1/2
Mack Dual Reduction, 1 1/2, 2, 2 1/2—1921	4	1 1/2	1 1/2	1 1/2	V	9 1/2	1 1/2	15 1/2	1 1/2	33	1 1/2	F	18 1/2	3 1/2	1/4	4	12	6	1/4	2	Opt	33 1/2
Mack AB-Tractor 5 Ton—'16-20	4	1 1/2	1 1/2	1 1/2	V	9 1/2	1 1/2	15 1/2	1 1/2	33	1 1/2	F	12 1/2	3 1/2	1/4	4	16 1/2	2 1/2	1/4	2	Opt	33 1/2
Mack AC 3 1/2 to 7 1/2 ton—'16-20	4	1 1/2	1 1/2	1 1/2	V	5 1/2	2 1/2	4 1/2	1 1/2	33	1 1/2	V	16 1/2	3	1/4	2	20 1/2	3 1/2	1/4	4	Opt	37 1/2
Mack AC Trac. 7 to 15 Ton—'16-20	4	1 1/2	1 1/2	1 1/2	V	5 1/2	2 1/2	4 1/2	1 1/2	33	1 1/2	V	16 1/2	3	1/4	2	20 1/2	3 1/2	1/4	4	Opt	37 1/2
Master JI-1 1/2—1919-20	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	30 1/2	1	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master JW-1 1/2—1919-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	30 1/2	1	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master M-2 1/2—1916-20	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	33	1 1/2	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master O 2 1/2—1917-20	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	33	1 1/2	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master W-2 1/2—1916-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	33	1 1/2	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master WL 2 1/2—1917-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master D-2 1/2—1920-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master DL-2 1/2—1920-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master T-6 Tractor—1917-21	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	12 1/2	1 1/2	31	1 1/2	F	74 1/2	2 1/2	1/4	1	74 1/2	2 1/2	1/4	1	117 1/2	34 1/2
Master A-3 1/2—1918-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	16	3 1/2	1/4	2	16	3 1/2	1/4	2	147 1/2	36 1/2
Master AL-3 1/2—1918-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	16	3 1/2	1/4	2	16	3 1/2	1/4	2	147 1/2	36 1/2
Master E-3 1/2—1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	11	6	1/4	2	25	4	1/4	4	147 1/2	36 1/2
Master EL-3 1/2—1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	33	1 1/2	F	11	6	1/4	2	25	4	1/4	4	147 1/2	36 1/2
Master B-5—1919-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1/4	2	18	4	1/4	2	162 1/2	39
Master BL-5—1919-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1/4	2	18	4	1/4	2	162 1/2	39
Master F-5—1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1/4	2	25	4	1/4	4	162 1/2	39
Master FL-5—1920-21	4	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1/4	2	25	4	1/4	4	162 1/2	39
Maxwell 1 1/2—1917-20	3	1 1/2	1 1/2	1 1/2	H	13 1/2	2	15	1 1/2	35	2	F	16	1 1/2	1/4	4	16	1 1/2	1/4	4	102	36
Menominee HT-1—1918-20	3	1 1/2	1 1/2	1 1/2	H	9 1/2	1 1/2	10 1/2	1 1/2	33 1/2	1 1/2	F	47 1/2	2 1/2	1/4	2	33 1/2	2 1/2	1/4	2	124	32
Menominee H-1 1/2—1916-20	3	1 1/2	1 1/2	1 1/2	H	9 1/2	1 1/2	10 1/2	1 1/2	33 1/2	1 1/2	F	47 1/2	2 1/2	1/4	2	33 1/2	2 1/2	1/4	2	124	32
Menominee D-2—1915-20	3	1 1/2	1 1/2	1 1/2	H	3	1 1/2	3	1 1/2	37 1/2	2	F	57 1/2	2 1/2	1/4	2	42 1/2	2 1/2	1/4	2	131 1/2	32
Menominee G-3 1/2—1916-20	3	1 1/2	1 1/2	1 1/2	H	3	1 1/2	3	1 1/2	37 1/2	2	F	57 1/2	2 1/2	1/4	2	42 1/2	2 1/2	1/4	2	149	36
Menominee J-5—1917-20	3	1 1/2	1 1/2	1 1/2	H	3	1 1/2	3	1 1/2	40 1/2	2	F	69 1/2	2 1/2	1/4	2	52	2 1/2	1/4	2	149	38
Menominee Ht-1—1920-late	3	1 1/2	1 1/2	1 1/2	H	10 1/2	2 1/2	4 1/2	2 1/2	42	1 1/2	F	21	2 1/2	1/4	2	20	2	1/4	2	108	32
Menominee H-1—1920-late	3	1 1/2	1 1/2	1 1/2	H	10 1/2	2 1/2	4 1/2	2 1/2	42	1 1/2	F	12	3 1/2	1/4	4	12	3 1/2	1/4	4	132	34
Menominee D-2—1920-late	3	1 1/2	1 1/2	1 1/2	H	9	1 1/2	13	1 1/2	42	1 1/2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	156	34
Menominee G-3 1/2—1920-late	3	1 1/2	1 1/2	1 1/2	H	9	2	19	2	42	2	F	16	3 1/2	1/4	4	16	3 1/2	1/4	4	168	38
Menominee J-5—1920-late	3	1 1/2	1 1/2	1 1/2	H	9	2	19	2	42	2	F	18	4	1/4	4	18	4	1/4	4	168	38
Moline	3	1 1/2	1 1/2	1 1/2	H	10 1/2	2 1/2	4 1/2	2 1/2	42	1 1/2	F	51	2 1/2	1/4	2	51	2 1/2	1/4	2	128 1/2	34
Moreland 21B-1 1/2—1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	1 1/2	13	1 1/2	42	1 1/2	F	12	3 1/2	1/4	4	12	3 1/2	1/4	4	132	34
Moreland 21C-2 1/2—1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	1 1/2	13	1 1/2	42	1 1/2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	156	34
Moreland 21H-4—1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	2	19	2	42	2	F	16	3 1/2	1/4	4	16	3 1/2	1/4	4	168	38
Moreland 21J-5—1919-20-21	3	1 1/2	1 1/2	1 1/2	H	9	2	19	2	42	2	F	18	4	1/4	4	18	4	1/4	4	168	38
Mutual 2B—1919-20	3	1 1/2	1 1/2	1 1/2	V	19	1 1/2	17	1 1/2	37 1/2	2	F	51	2 1/2	1/4	2	51	2 1/2	1/4	2	128 1/2	34
Mutual 2BP—1919-20	3	1 1/2	1 1/2	1 1/2	V	19	1 1/2	17	1 1/2	37 1/2	2	F	51	2 1/2	1/4	2	51	2 1/2	1/4	2	128 1/2	34
Napoleon 9-1—1919-20	3	1 1/2	1 1/2	1 1/2	V	6	2 1/2	12	2	36	1	F	44	2	1/4	1	30	2 1/2	1/4	1	101	35 1/2
Napoleon 11-1 1/2—1919-20	3	1 1/2	1 1/2	1 1/2	V	6	2 1/2	12	2	36	1	F	49	2	1/4	1	30	2 1/2	1/4	1	101	35 1/2
Nash 2018-1—1919-20	4																					



## Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME		
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Pittsburgher 2½—1919-20.....	3	1½	1½	1½	V	6	1½	12	1½	37	1	F	52	2½	1½	2	52	2½	1½	2	136	33
Pioneer 50AA-1.....	3	1½	1½	1½	V	13	2	12	2	35	1	F	14	1½	1½	4	14	1½	1½	4	102	30
Rainier R-8-2.....	3	1½	1½	1½	V	5	1½	13	1½	31½	1½	F	44½	2	1½	2	44½	2	1½	2	113	34
Rainier R6-1½.....	3	1½	1½	1½	V	9½	1½	14½	1½	41	1½	F	19	2	1½	2	19	2	1½	2	100	34
Rainier R-19-1.....	3	1½	1½	1½	V	8½	1½	14	1½	41	1½	F	19	2	1½	2	19	2	1½	2	100	34
Rainier R11-¾.....	3	1½	1½	1½	V	9	1½	14½	1½	42	1½	F	11½	3	1½	2	11½	3	1½	2	90	34
Ranger TK-22-2.....	3	1½	1½	1½	H	11½	1½	10	1½	33¾	1	F	11½	3	1½	2	11½	3	1½	2	106½	33
Reliance 10A-1½—1920-21.....	4	1½	1½	1½	V	10½	2	13½	1½	35	2	F	17	2	1½	4	17	2	1½	4	122	32
Reliance 20B-2½—1920-21.....	4	1½	1½	1½	V	10½	2	13½	1½	35	2	F	17	2	1½	4	17	2	1½	4	127	32
Reo F—1500-2500-lbs.....	3	1	1	1	V	5½	1	5½	1	39	¾	F	43	2½	1½	1	39½	2½	1½	1	82	30
Republic 10-1-10E-1-1919-20-21.....	3	1	1	1	V	12½	2	6	2	40½	1½	F	21½	2½	1½	4	19½	2½	1½	4	118	34
Republic 11X-1½—1919-20-21.....	3	1	1	1	V	12½	2	6	2	40½	1½	F	25½	2½	1½	4	24½	2½	1½	2	121	34
Republic 19-2½—1919-20-21.....	3	1½	1½	1½	V	8	1½	11½	1½	32	1½	F	25½	3	1½	4	24½	2½	1½	2	121	34
Republic 20-3½—1919-20-21.....	3	1½	1½	1½	V	7½	1½	11½	1½	36½	1½	F	55½	3½	1½	2	30½	3½	1½	1	146	37
Republic 75-¾—1921.....	3	1	1	1	V	12	2½	18½	2½	31½	1	F	19	2	1½	4	18	2	1½	4	95	31
Reynolds 3A-1½.....	3	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	46	2	1½	2	46	2	1½	2	121	33
Reynolds 5A-2½.....	3	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	52½	2½	1½	2	52½	2½	1½	2	126	33
Reynolds 7A-3½.....	3	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	57	2½	1½	2	57	2½	1½	2	148	37
Reynolds 10A-5.....	3	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	70	3	1½	2	70	3	1½	2	148	37
Riker B3, BB-4.....	5	1½	1½	1½	V	9½	1½	8	1½	49½	1½	V	7½	4½	1½	2	20	4	1½	4	150	38
Rowe CW-1½—1918-19-20.....	3	1½	1½	1½	V	10½	1½	10½	1½	32½	1½	F	19	2	1½	8	19	2	1½	8	113	33
Rowe CDW2—1916-20.....	3	1½	1½	1½	V	10½	1½	10½	1½	32½	1½	F	45	2	1½	4	45	2	1½	4	123	33
Rowe GSW3—1918-20.....	3	1½	1½	1½	V	20	1½	15½	1½	36½	2	F	51½	2½	1½	4	51½	2½	1½	4	140	33
Rowe HW4—1918-20.....	3	1½	1½	1½	V	20	1½	15½	1½	36½	2	F	56½	2½	1½	4	56½	2½	1½	4	146	36
Rowe FW5—1914-20.....	3	1½	1½	1½	V	20	1½	15½	1½	36½	2	F	68	3	1½	4	68	3	1½	4	153	38½
Rowe GPW3—1916-17, 1919-20.....	3	1½	1½	1½	V	10	1½	6	1½	37	2	F	18	2	1½	4	18	2	1½	4	152	33
Rumely A-1½.....	4	1½	1½	1½	V	10½	1½	10½	1½	37	2	F	18	2	1½	4	18	2	1½	4	122	34
Samson 15-¾.....	3	1½	1½	1½	V	6½	1½	7½	1½	37	2	V	43½	2	1½	1	37	2	1½	1	108½	39½
Samson 25-1½.....	3	1½	1½	1½	V	6½	1½	7½	1½	37	2	V	43½	2	1½	1	37	2	1½	1	108½	39½
Sandow G-1—1918-20.....	3	1	1	1	V	12½	2	6	2	40½	1½	F	21½	2½	1½	4	19½	2½	1½	4	118	34
Sandow CG-1½—1918-20.....	3	1	1	1	V	12½	2	6	2	40½	1½	F	21½	2½	1½	4	19½	2½	1½	4	118	34
Sandow I-2—1918-20.....	3	1	1	1	V	12½	2	6	2	40½	1½	F	21½	2½	1½	4	19½	2½	1½	4	118	34
Sandow J-2½—1918-20.....	3	1½	1½	1½	V	12½	2	6	2	40½	1½	F	13½	3½	1½	2	16	3½	1½	2	144	32
Sandow L-5—1918-20.....	3	1½	1½	1½	V	12½	2	6	2	40½	1½	F	24	4½	1½	2	24	4½	1½	2	144	37
Sandow M-3½—1918-20.....	3	1½	1½	1½	V	12½	2	6	2	40½	1½	F	18½	4	1½	2	18½	4	1½	2	144	37
Sanford 25-2½—1917-20.....	3	1½	1½	1½	V	8	1½	11½	1½	32	1½	F	51½	2½	1½	2	51½	2½	1½	2	144	35
Sanford W35-2½—1917-20.....	3	1½	1½	1½	V	8	1½	11½	1½	32	1½	F	56	2½	1½	2	56	2½	1½	2	145	35
Sanford W50-5—1917-20.....	3	1½	1½	1½	V	8	1½	11½	1½	32	1½	F	69	3	1½	2	69	3	1½	2	145	35
Schacht 2.....	3	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	81½	3½	1½	4	13½	3	1½	4	140	35½
Schacht 2½.....	3	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	81½	3½	1½	4	13½	3	1½	4	140	35½
Schacht 3½.....	4	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	81½	3½	1½	4	13½	3	1½	4	152	36½
Schacht 5.....	4	1½	1½	1½	V	10½	1½	13½	1½	37	2	F	81½	3½	1½	4	15	4	1½	4	152	36½
Schwartz A-1½—1921.....	3	1	1	1	V	9½	2½	13	2½	29½	2½	F	19½	1½	1½	4	19½	1½	1½	4	120	34
Schwartz BW-1½.....	4	1½	1½	1½	V	10	1½	18	1½	33½	2	F	19	2	1½	4	19	2	1½	4	120	34
Schwartz CWS-CW-CWL-2½.....	4	1½	1½	1½	V	10½	2	15	1½	33½	2	F	48	2½	1½	2	48	2½	1½	2	126	34
Schwartz DWS-DW-DWL-5.....	4	1½	1½	1½	V	12½	2	17	1½	38½	2	F	69½	3	1½	2	69½	3	1½	2	168	38
Selden 1½A—1919-20.....	3	1	1	1	V	12	1½	12	1½	41	1½	F	11½	3½	1½	2	11½	3½	1½	4	114	34
Selden 2½A—1920.....	3	1	1	1	V	9	1½	5½	1½	34½	2	F	13½	3½	1½	2	13½	3½	1½	4	134	34
Selden 3½A—1919-20.....	3	1½	1½	1½	V	7	2	20½	2	40½	2	F	15½	3½	1½	2	15½	3½	1½	4	153	37½
Selden 5A—1920.....	3	1½	1½	1½	V	7	2	20½	2	40½	2	F	18	4	1½	2	18	4	1½	4	153	37½
Seneca M-1000.....	3	1	1	1	V	13½	2	13½	2	34	¾	F	37½	1½	1½	2	35½	1½	1½	2	101½	37½
Service 15-1921-¾.....	3	1½	1½	1½	V	10	1½	2	1½	35	2	F	12	3½	1½	4	12	3½	1½	4	101½	37
Service 220-1—1919-20.....	3	1½	1½	1½	V	10	2	6	1½	37½	1	F	12	3½	1½	2	12	3½	1½	2	109½	34
Service 31-1½—1919-20.....	4	1½	1½	1½	V	10	2	8	1½	33	1½	F	12	3½	1½	2	12	3½	1½	2	121	34
Service 36-1½—1919-20.....	4	1½	1½	1½	V	10	2	8	1½	33	1½	F	12	3½	1½	2	12	3½	1½	2	121	34
Service 51-2½—1919-20.....	4	1½	1½	1½	V	10	2	8	1½	33	1½	F	13½	3½	1½	2	13½	3½	1½	2	131	34
Service 71-3½—1919-20.....	4	1½	1½	1½	V	10	2	8	1½	33	1½	F	16	3½	1½	2	16	3½	1½	2	150½	38
Service 76-3½—1919-20.....	4	1½																				

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency			Length	Width			
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Traffic C-4000—1919-20.....	3	3	1	1	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	43 1/2	2 1/2	1/4	2	38	1 1/4	1/4	2	120 3/4	42
Traffic 6000-1921.....	3	3	1	1	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	43 1/2	2 1/2	1/4	2	38	1 1/4	1/4	2	120 3/4	34
Traffic Speedboy-1921.....	3	3	1	1	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	43 1/2	2 1/2	1/4	2	38	1 1/4	1/4	2	120 3/4	34
Transport 20-1.....	3	3	1	1	V	12	2	12	2	36 3/4	1	F	48 1/2	2	1/4	2	46 1/2	1 1/2	1/4	2	101	34
Transport 30-1 1/2.....	3	3	1	1	V	10 1/2	2	13	2	40 3/4	1 1/4	F	48 1/2	2 1/2	1/4	2	46 1/2	1 1/2	1/4	2	117	34
Transport 50-2 1/2.....	3	3	1 1/4	1 1/4	V	9 1/2	2	10	1 1/4	32 3/4	2	F	10 1/2	3 1/2	1/4	4	48 1/2	2 1/2	1/4	2	123	34
Transport 70-3 1/2.....	4	4	1 1/4	1 1/4	V	12	2	16	1 1/4	35 3/4	2	F	11 1/2	3	1/4	4	58	2 1/2	1/4	2	150	36 1/2
Traylor B-1 1/2.....	4	4	1	1	V					38	1	F	50	2	1/4	2	50	2	1/4	2	117	34
Traylor C-2.....	4	4	1 1/4	1 1/4	V					36	2	F	50	2	1/4	2	50	2	1/4	2	122	34
Traylor D-3.....	4	4	1 1/4	1 1/4	V					36	2	F	56 1/2	2 1/4	1/4	2	56 1/2	2 1/4	1/4	2	142	34
Traylor E-4.....	4	4	1 1/4	1 1/4	V					37	2	F	59	2 1/2	1/4	2	59	2 1/2	1/4	2	165	35
Traylor F-5.....	4	4	1 1/4	1 1/4	V					37	2	F	59	2 1/2	1/4	2	59	2 1/2	1/4	2	165	35
Triangle AA-1/2—1920.....	3	3	1	1	H	17	2	17	2	34	1	F	22	2 1/2	1/4	1	41	2	1/4	2	94	35
Triangle A-1 1/2—1918-20.....	3	3	1	1	V	14	1 1/4	14 1/2	1 1/4	39 1/4	1 1/4	F	7	4	1/4	2	49	2	1/4	2	126	34
Triangle B-2 1/2—1919-20.....	3	3	1 1/4	1 1/4	V	18	1 1/2	18	1 1/2	39 1/4	1 1/4	F	7	4	1/4	2	52	3	1/4	2	132	34
Triangle C-2—1920.....	3	3	1	1	V	14	1 1/4	14 1/2	1 1/4	39 1/4	1 1/4	F	7	4	1/4	2	52	3	1/4	2	129	34
Triumph HB-2 1/2.....	4	4			V	9	1 1/4	17	1 1/4	32 1/2	2	F	46	2 1/2	1/4	2	32	2 1/2	1/4	2	120	34 1/2
Triumph HC-2.....	4	4			V	9	1 1/4	17	1 1/4	32 1/2	2	F	46	2 1/2	1/4	2	32	2 1/2	1/4	2	120	34 1/2
Twin City 2.....	4	4	1 1/4	1 1/4	V	11	2	13	1 1/4	36 1/4	2	F	50	3	1/4	2	48	2 1/2	1/4	2	132	33
Twin City 3 1/2.....	4	4	1 1/4	1 1/4	V	8	1 1/2	4	1 1/4	36 1/4	2	F	15	3 1/4	1/4	4	15	3 1/4	1/4	4	156	36
Ultimate A-2—1920.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	45	2	1/4	2	45	2	1/4	2	126	32 1/2
Ultimate AJ2—1920.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	45	2	1/4	2	45	2	1/4	2	126	32 1/2
Ultimate AJL-2-1920.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	45	2	1/4	2	45	2	1/4	2	150	32 1/2
Ultimate B-3—1920.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	144	32 1/2
Ultimate BL3—1920.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	192	32 1/2
Union F-2 1/2.....	3	3	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	2	F	55	3	1/4	1	50	2	1/4	1	133 1/2	32
Union FW-2 1/2.....	3	3	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	2	F	26	4 1/4	1/4	1	52	3	1/4	1	133 1/2	32
Union H-4.....	3	3	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	2	F	56 3/4	3 1/4	1/4	1	32	4 1/2	1/4	1	157 1/2	34
Union HW-4.....	3	3	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	2	F	26	4 1/4	1/4	1	24	4	1/4	1	157 1/2	34
Union JW-6.....	3	3	1 1/2	1 1/2	V	20	1 1/4	19 1/2	1 1/4	41 1/2	2	F	34	4	1/4	1	28	5	1/4	2	190	36
United 1 1/2.....			1 1/4	1 1/4	V	15	2 1/2	16	1 1/2	37 1/2	2	F	48	2	1/4	1	48	1 1/2	1/4	1	120	33
United 2 1/2.....			1 1/4	1 1/4	V	7	2 1/2	12	1 1/2	37 1/2	2	F	49	3	1/4	1	49	2 1/2	1/4	1	Opt	33
United 3 1/2.....			1 1/4	1 1/4	V	7	2 1/2	12	1 1/2	37 1/2	2	F	62	3	1/4	1	58	2 1/2	1/4	1	Opt	34
United 5.....			1 1/2	1 1/2	V	14 1/2	2	12	1 1/2	37 1/2	2	F	88 1/2	2 1/4	1/4	1	88 1/2	2 1/4	1/4	1	Opt	38
U.S.N.-1 1/2.....	3	3	1	1	H	11 1/2	2	9	1 1/4	37	1 1/4	F	50	2 1/2	1/4	2	46 1/2	1 1/2	1/4	2	120	34
U.S.R.-2 1/2-3.....	3	3	1 1/4	1 1/4	V	10	1 1/4	9	1 1/4	35	1 1/4	F	46	2 1/4	1/4	2	46	2 1/4	1/4	2	144	34
U.S.S.-3 1/2-4.....	3	3	1 1/4	1 1/4	V	9	1 1/2	8	1 1/2	37	1 1/4	F	50	2 1/2	1/4	2	50	2 1/2	1/4	2	156	36
U.S.T.-5-6.....	3	3	1 1/2	1 1/2	V	15	2	13	1 1/2	38 3/4	2	F	62	3	1/4	4	33	4	1/4	1	168	36
Velie 46-1 1/2—1921.....	3	3	1	1	V	9 1/2	2 1/2	12 1/4	1 1/2	40	1 1/4	F	54	2 1/2	1/4	2	52 1/2	2 1/4	1/4	2	120	31
Vim 29-1 1/2.....	3	3	1 1/4	1 1/4	V					30 3/4	1	F	14 1/2	1 1/2	1/4	4	14 1/2	1 1/2	1/4	4	64	30
Vim 30-1 1/2.....	3	3	1 1/4	1 1/4	V					30 3/4	1	F	14 1/2	1 1/2	1/4	4	14 1/2	1 1/2	1/4	4	83 1/2	30
Vim 31-1.....	4	4	1	1	V					40	1	F	18	2	1/4	4	18	2	1/4	4	92	32
Vim 22-2.....	4	4	1	1	V					40	1	F	42 1/2	2	1/4	2	42 1/2	2	1/4	2	120 3/4	34
Vim 23-3.....	5	5	1 1/4	1 1/4	V					40	1	F	48 1/2	2 1/4	1/4	2	48 1/2	2 1/4	1/4	2	160 1/4	34
Walker M 1/2.....										43	2 1/4	F	43	2 1/4	1/4	2	14	1 1/4	1/4	4	90	32
Walker K1.....										45 1/2	2 1/2	F	53 1/2	2 1/2	1/4	2	16	2	1/4	4	96	32
Walker L2.....										53 1/4	2 1/2	F	53 1/4	2 1/2	1/4	2	19	2	1/4	4	120	32
Walker P3 1/2.....										53 1/4	3	F	53 1/4	3	1/4	2	19 1/4	2 1/2	1/4	4	140	35
Walker N5.....										53 1/4	3	F	53 1/4	3	1/4	2	19 1/4	2 1/2	1/4	4	162	35
Walker-Johnson B2 1/2.....	4	4	1 1/4	1 1/4	V	10	1 1/2	18	1 1/2	39	1 1/2	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	133	32 1/2
Walter S-5.....	3	3	1 1/4	1 1/4	V	7	1 1/2	16	1 1/2	41 1/2	1 1/2	F	15	5	1/4	4	57	2 1/2	1/4	2	150	36
Ward LaFrance 2B-2 1/2-3—1920.....	3	3	1 1/4	1 1/4	V	8 1/2	1 1/2	18	1 1/2	41 1/2	1 1/2	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	137 1/2	33
Ward LaFrance 4A-3 1/2-4—1920.....	3	3	1 1/4	1 1/4	V	9 1/4	1 1/2	18	1 1/2	41 1/2	1 1/2	F	15 1/2	3 1/4	1/4	4	15 1/2	3 1/4	1/4	4	170 1/2	37
Ward LaFrance 5A-5-6—1920.....	3	3	1 1/4	1 1/4	V	9 1/4	1 1/2	18	1 1/2	41 1/2	1 1/2	F	18	4	1/4	4	18	4	1			





Trade Name and Model	Chassis Price	ENGINE DETAILS										Clutch (Type)	Ignition System	Engine Starter	GEARSET		REAR AXLE		STEERING GEAR		TIRES, WHEELS, RIMS			Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels							
		Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrange't	How Cooled	Radiator (Make)		Lubrication	Carburetor	Fuel Feed				Governor (Make)		Clutch (Make)	Speeds	Universal (Make)	Springs (Make)	Final Drive	Make	Type				Total Gear Ratio	Total Gear Ratio in High	Steering Gear (Make)	Front		Wheels (Make)	Rim Equipment
							Radiator (Type)	Radiator (Make)							Radiator (Type)	Radiator (Make)														Pneumatic	†Dual		
<b>1000 Pounds</b>																																	
Dodge Brothers	885	3 1/2 x 5 1/2	24	L	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Kel	Kel	1990	114	86.5		
Seneca M.	1020	3 1/2 x 5 1/2	15.6	L	L	Kue	McC	PT	S	FS	Sheb	V	Full	DD	W	AC	W	U	U	U	U	U	U	U	U	U	U	U	1700	108	80		
Win 20	1050	3 1/2 x 5 1/2	15.6	L	L	McC	McC	Fin	FS	Zen	Sheb	GG	Full	DD	W	W	W	U	U	U	U	U	U	U	U	U	U	U	2175	108	80		
Win 30	1175	3 1/2 x 5 1/2	15.6	L	L	McC	McC	Fin	FS	Zen	Sheb	GG	Full	DD	W	W	W	U	U	U	U	U	U	U	U	U	U	U	2290	127	80		
<b>1500 Pounds</b>																																	
Acson Fast	915	3 3/4 x 5	22.5	L	L	GO	GO	C	F	Sheb	V	Full	DD	D	Eis	GD	Full	U	U	U	U	U	U	U	U	U	U	U	3080	142	80		
Acme G.	915	3 3/4 x 5	19.6	T	L	GO	GO	C	F	Sheb	V	Full	DD	D	Con	AC	Full	U	U	U	U	U	U	U	U	U	U	U	3080	130	50		
Bowman L.	745	3 3/4 x 5 1/2	21.7	H	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	2700	114	80		
Brokway E.	1890	3 3/4 x 5 1/2	22.5	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	3450	135	70		
Clydeedale 18	1890	3 3/4 x 5 1/2	22.5	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	2167	120	70		
Gard 15	1890	3 3/4 x 5 1/2	22.5	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	3200	136	64		
Globe D-20	1495	3 3/4 x 5 1/2	18.2	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	3500	132	64		
H. R. L. J.	2200	3 3/4 x 5 1/2	19.6	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	2600	120	50		
Internat'l Speed Truck 8	1500	3 3/4 x 5 1/2	19.6	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	3300	134	50		
Lyco-Int'l	1600	3 3/4 x 5 1/2	19.6	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	3300	124	50		
Kearns M.	1350	3 3/4 x 5 1/2	19.6	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	3300	124	50		
Napoleon 7	1900	3 3/4 x 5 1/2	19.6	L	L	GO	GO	Fin	FS	Strm	Sheb	V	Full	DD	Con	RE	Full	U	U	U	U	U	U	U	U	U	U	U	3300	124	50		
Rainier R11	1250	3 3/4 x 5 1/2																															



[illegible]





Charities only





† Chassis Only

[illegible]



3448	Reinhold 7A	4275	Signal M	4325	Stewart 10X	4350	Super truck 70	4385	Tiffin PW	4400	Titan 3 1/2	4410	Tower 3 1/2	4420	Transport 3 1/2	4430	Twin City 3 1/2	4440	Twin City 3 1/2	4450	Ward L	4460	Ward L	4470	Ward L	4480	Ward L	4490	Ward L	4500	Ward L	4510	Ward L	4520	Ward L	4530	Ward L	4540	Ward L	4550	Ward L	4560	Ward L	4570	Ward L	4580	Ward L	4590	Ward L	4600	Ward L	4610	Ward L	4620	Ward L	4630	Ward L	4640	Ward L	4650	Ward L	4660	Ward L	4670	Ward L	4680	Ward L	4690	Ward L	4700	Ward L	4710	Ward L	4720	Ward L	4730	Ward L	4740	Ward L	4750	Ward L	4760	Ward L	4770	Ward L	4780	Ward L	4790	Ward L	4800	Ward L	4810	Ward L	4820	Ward L	4830	Ward L	4840	Ward L	4850	Ward L	4860	Ward L	4870	Ward L	4880	Ward L	4890	Ward L	4900	Ward L	4910	Ward L	4920	Ward L	4930	Ward L	4940	Ward L	4950	Ward L	4960	Ward L	4970	Ward L	4980	Ward L	4990	Ward L	5000	Ward L	5010	Ward L	5020	Ward L	5030	Ward L	5040	Ward L	5050	Ward L	5060	Ward L	5070	Ward L	5080	Ward L	5090	Ward L	5100	Ward L	5110	Ward L	5120	Ward L	5130	Ward L	5140	Ward L	5150	Ward L	5160	Ward L	5170	Ward L	5180	Ward L	5190	Ward L	5200	Ward L	5210	Ward L	5220	Ward L	5230	Ward L	5240	Ward L	5250	Ward L	5260	Ward L	5270	Ward L	5280	Ward L	5290	Ward L	5300	Ward L	5310	Ward L	5320	Ward L	5330	Ward L	5340	Ward L	5350	Ward L	5360	Ward L	5370	Ward L	5380	Ward L	5390	Ward L	5400	Ward L	5410	Ward L	5420	Ward L	5430	Ward L	5440	Ward L	5450	Ward L	5460	Ward L	5470	Ward L	5480	Ward L	5490	Ward L	5500	Ward L	5510	Ward L	5520	Ward L	5530	Ward L	5540	Ward L	5550	Ward L	5560	Ward L	5570	Ward L	5580	Ward L	5590	Ward L	5600	Ward L	5610	Ward L	5620	Ward L	5630	Ward L	5640	Ward L	5650	Ward L	5660	Ward L	5670	Ward L	5680	Ward L	5690	Ward L	5700	Ward L	5710	Ward L	5720	Ward L	5730	Ward L	5740	Ward L	5750	Ward L	5760	Ward L	5770	Ward L	5780	Ward L	5790	Ward L	5800	Ward L	5810	Ward L	5820	Ward L	5830	Ward L	5840	Ward L	5850	Ward L	5860	Ward L	5870	Ward L	5880	Ward L	5890	Ward L	5900	Ward L	5910	Ward L	5920	Ward L	5930	Ward L	5940	Ward L	5950	Ward L	5960	Ward L	5970	Ward L	5980	Ward L	5990	Ward L	6000	Ward L	6010	Ward L	6020	Ward L	6030	Ward L	6040	Ward L	6050	Ward L	6060	Ward L	6070	Ward L	6080	Ward L	6090	Ward L	6100	Ward L	6110	Ward L	6120	Ward L	6130	Ward L	6140	Ward L	6150	Ward L	6160	Ward L	6170	Ward L	6180	Ward L	6190	Ward L	6200	Ward L	6210	Ward L	6220	Ward L	6230	Ward L	6240	Ward L	6250	Ward L	6260	Ward L	6270	Ward L	6280	Ward L	6290	Ward L	6300	Ward L	6310	Ward L	6320	Ward L	6330	Ward L	6340	Ward L	6350	Ward L	6360	Ward L	6370	Ward L	6380	Ward L	6390	Ward L	6400	Ward L	6410	Ward L	6420	Ward L	6430	Ward L	6440	Ward L	6450	Ward L	6460	Ward L	6470	Ward L	6480	Ward L	6490	Ward L	6500	Ward L	6510	Ward L	6520	Ward L	6530	Ward L	6540	Ward L	6550	Ward L	6560	Ward L	6570	Ward L	6580	Ward L	6590	Ward L	6600	Ward L	6610	Ward L	6620	Ward L	6630	Ward L	6640	Ward L	6650	Ward L	6660	Ward L	6670	Ward L	6680	Ward L	6690	Ward L	6700	Ward L	6710	Ward L	6720	Ward L	6730	Ward L	6740	Ward L	6750	Ward L	6760	Ward L	6770	Ward L	6780	Ward L	6790	Ward L	6800	Ward L	6810	Ward L	6820	Ward L	6830	Ward L	6840	Ward L	6850	Ward L	6860	Ward L	6870	Ward L	6880	Ward L	6890	Ward L	6900	Ward L	6910	Ward L	6920	Ward L	6930	Ward L	6940	Ward L	6950	Ward L	6960	Ward L	6970	Ward L	6980	Ward L	6990	Ward L	7000	Ward L	7010	Ward L	7020	Ward L	7030	Ward L	7040	Ward L	7050	Ward L	7060	Ward L	7070	Ward L	7080	Ward L	7090	Ward L	7100	Ward L	7110	Ward L	7120	Ward L	7130	Ward L	7140	Ward L	7150	Ward L	7160	Ward L	7170	Ward L	7180	Ward L	7190	Ward L	7200	Ward L	7210	Ward L	7220	Ward L	7230	Ward L	7240	Ward L	7250	Ward L	7260	Ward L	7270	Ward L	7280	Ward L	7290	Ward L	7300	Ward L	7310	Ward L	7320	Ward L	7330	Ward L	7340	Ward L	7350	Ward L	7360	Ward L	7370	Ward L	7380	Ward L	7390	Ward L	7400	Ward L	7410	Ward L	7420	Ward L	7430	Ward L	7440	Ward L	7450	Ward L	7460	Ward L	7470	Ward L	7480	Ward L	7490	Ward L	7500	Ward L	7510	Ward L	7520	Ward L	7530	Ward L	7540	Ward L	7550	Ward L	7560	Ward L	7570	Ward L	7580	Ward L	7590	Ward L	7600	Ward L	7610	Ward L	7620	Ward L	7630	Ward L	7640	Ward L	7650	Ward L	7660	Ward L	7670	Ward L	7680	Ward L	7690	Ward L	7700	Ward L	7710	Ward L	7720	Ward L	7730	Ward L	7740	Ward L	7750	Ward L	7760	Ward L	7770	Ward L	7780	Ward L	7790	Ward L	7800	Ward L	7810	Ward L	7820	Ward L	7830	Ward L	7840	Ward L	7850	Ward L	7860	Ward L	7870	Ward L	7880	Ward L	7890	Ward L	7900	Ward L	7910	Ward L	7920	Ward L	7930	Ward L	7940	Ward L	7950	Ward L	7960	Ward L	7970	Ward L	7980	Ward L	7990	Ward L	8000	Ward L	8010	Ward L	8020	Ward L	8030	Ward L	8040	Ward L	8050	Ward L	8060	Ward L	8070	Ward L	8080	Ward L	8090	Ward L	8100	Ward L	8110	Ward L	8120	Ward L	8130	Ward L	8140	Ward L	8150	Ward L	8160	Ward L	8170	Ward L	8180	Ward L	8190	Ward L	8200	Ward L	8210	Ward L	8220	Ward L	8230	Ward L	8240	Ward L	8250	Ward L	8260	Ward L	8270	Ward L	8280	Ward L	8290	Ward L	8300	Ward L	8310	Ward L	8320	Ward L	8330	Ward L	8340	Ward L	8350	Ward L	8360	Ward L	8370	Ward L	8380	Ward L	8390	Ward L	8400	Ward L	8410	Ward L	8420	Ward L	8430	Ward L	8440	Ward L	8450	Ward L	8460	Ward L	8470	Ward L	8480	Ward L	8490	Ward L	8500	Ward L	8510	Ward L	8520	Ward L	8530	Ward L	8540	Ward L	8550	Ward L	8560	Ward L	8570	Ward L	8580	Ward L	8590	Ward L	8600	Ward L	8610	Ward L	8620	Ward L	8630	Ward L	8640	Ward L	8650	Ward L	8660	Ward L	8670	Ward L	8680	Ward L	8690	Ward L	8700	Ward L	8710	Ward L	8720	Ward L	8730	Ward L	8740	Ward L	8750	Ward L	8760	Ward L	8770	Ward L	8780	Ward L	8790	Ward L	8800	Ward L	8810	Ward L	8820	Ward L	8830	Ward L	8840	Ward L	8850	Ward L	8860	Ward L	8870	Ward L	8880	Ward L	8890	Ward L	8900	Ward L	8910	Ward L	8920	Ward L	8930	Ward L	8940	Ward L	8950	Ward L	8960	Ward L	8970	Ward L	8980	Ward L	8990	Ward L	9000	Ward L	9010	Ward L	9020	Ward L	9030	Ward L	9040	Ward L	9050	Ward L	9060	Ward L	9070	Ward L	9080	Ward L	9090	Ward L	9100	Ward L	9110	Ward L	9120	Ward L	9130	Ward L	9140	Ward L	9150	Ward L	9160	Ward L	9170	Ward L	9180	Ward L	9190	Ward L	9200	Ward L	9210	Ward L	9220	Ward L	9230	Ward L	9240	Ward L	9250	Ward L	9260	Ward L	9270	Ward L	9280	Ward L	9290	Ward L	9300	Ward L	9310	Ward L	9320	Ward L	9330	Ward L	9340	Ward L	9350	Ward L	9360	Ward L	9370	Ward L	9380	Ward L	9390	Ward L	9400	Ward L	9410	Ward L	9420	Ward L	9430	Ward L	9440	Ward L	9450	Ward L	9460	Ward L	9470	Ward L	9480	Ward L	9490	Ward L	9500	Ward L	9510	Ward L	9520	Ward L	9530	Ward L	9540	Ward L	9550	Ward L	9560	Ward L	9570	Ward L	9580	Ward L	9590	Ward L	9600	Ward L	9610	Ward L	9620	Ward L	9630	Ward L	9640	Ward L	9650	Ward L	9660	Ward L	9670	Ward L	9680	Ward L	9690	Ward L	9700	Ward L	9710	Ward L	9720	Ward L	9730	Ward L	9740	Ward L	9750	Ward L	9760	Ward L	9770	Ward L	9780	Ward L	9790	Ward L	9800	Ward L	9810	Ward L	9820	Ward L	9830	Ward L	9840	Ward L	9850	Ward L	9860	Ward L	9870	Ward L	9880	Ward L	9890	Ward L	9900	Ward L	9910	Ward L	9920	Ward L	9930	Ward L	9940	Ward L	9950	Ward L	9960	Ward L	9970	Ward L	9980	Ward L	9990	Ward L	10000	Ward L
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## ELECTRIC COMMERCIAL CARS

E. C. M.	Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
	Ward WS 2.....	750	1500	.....	13	Opt	45	G-E	Own	4	W	Shel	Shel	32x3	32x3	Own	88	60
	C-T 500.....	1000	2100	1600	14	Opt	55	G-E	Own	4	C-T	Flot	Shel	36x3	36x3 1/2	W	92	.....
	Walker M.....	1000	2300	.....	15	Opt	60	G-E	West	5	O	Own	Math	34x3	36x3 1/2	Ross	94	66
	Atlantic 1C.....	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
	Ward WA 2.....	1250	2350	.....	12	Opt	45	G-E	Own	4	W	Shel	Shel	32x3 1/2	34x4	Own	90	60
	Ward WB.....	1250	2730	.....	12	Opt	45	G-E	Own	4	W	Shel	Shel	32x3 1/2	34x4	Own	90	60
	C-T BR 2.....	2000	2150	2400	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3 1/2	36x4	W	101	60
	C-T BR 2A.....	1500	1975	2200	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3 1/2	36x4	W	91 1/2	60
	Lansden BG 3/4.....	.....	1400	1600	15	Opt	50	G-E	G-E	4	R	Flot	.....	32x4 1/2	32x4 1/2	Lav	90	60
	Lansden MC 1.....	.....	2900	1850	12	Opt	50	G-E	G-E	4	C	Flot	.....	32x4 1/2	32x4 1/2	.....	108	60
	Steinmets.....	1500	1900	.....	16 1/2	Opt	45	Diehl	Own	4	B	Own	.....	33x5	36x3 1/2	.....	114	60
	Walker K.....	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3 1/2	36x4	Ross	96	66
	Ward WM.....	2000	2250	.....	12	Opt	45	G-E	Own	4	W	Shel	Shel	32x3 1/2	32x4	Own	88	70
	Ward WB.....	2000	3420	.....	10.5	Opt	40	G-E	G-E	4	W	Shel	Shel	34x4	36x5	Own	102	60
	Atlantic 2C.....	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x3 1/2	Ross	115	65
	C-T BR 4.....	4000	4000	2575	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4 1/2	W	116	60
	Lansden MD 2.....	.....	4400	2250	11	Opt	50	G-E	G-E	4	C	Flot	.....	36x4	36x3 1/2	.....	120	60
	Walker L.....	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	64
	Ward WD.....	4000	4500	.....	9	Opt	35	G-E	G-E	4	W	Shel	Shel	36x6	36x7	Own	114	60
	Atlantic 3C.....	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5 1/2	Ross	135	65
	C-T AR 7.....	7000	5000	3550	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x5	36x5 1/2	W	126	60
	C-T AK 7.....	7000	5800	3850	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6	36x4 1/2	W	122	55
	Lansden ME 3 1/2.....	.....	5700	2950	10	Opt	45	G-E	G-E	4	C	Flot	.....	36x5	36x4 1/2	.....	133	60
	Ward WF.....	7000	6600	.....	8	Opt	30	G-E	G-E	5	W	Shel	Shel	36x6	36x10	Own	132	70
	Atlantic 5C.....	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5 1/2	Ross	144	65
	Couple Gear H.....	7000	9000	4750	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55
	Couple Gear A.....	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	75
	C-T AK 10.....	10000	6500	3960	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5 1/2	W	132	55
	Lansden MT 5.....	.....	7500	3350	10	Opt	40	G-E	G-E	4	C	Flot	.....	36x6	36x5 1/2	.....	146	60
	Lansden MG 6.....	.....	8900	.....	7	Opt	35	G-E	G-E	4	R	Flot	.....	36x7	36x6 1/2	.....	156	60
	Walker P.....	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	40x5 1/2	Ross	131	66
	Walker N.....	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	40x6 1/2	Ross	141	66
	Ward WH.....	10000	8200	.....	7	Opt	26	G-E	G-E	5	W	Shel	Shel	36x7	40x12	Own	144	70
	Atlantic 6C.....	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
	Couple Gear LD.....	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55

## Manufacturers and Models Included in Specifications on Preceding Pages

Acason—3/4, 1, 1 1/2, 2 1/2, 3 1/2, 5—Acason Motor Truck Co., Detroit Mich.

Ace—1 1/2, 2 1/2—American Motor Truck Co., Newark, Ohio.

Acme—3/4, 1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Acme Motor Truck Co., Cadillac, Mich.

Ajax—1 1/2—Ajax Motors Corp., Boston, Mass.

Akron Multi-Truck—1 1/4—Thomast Motor Truck Co., Kent, Ohio.

American—2 1/2, 4—American Motor Truck & Tractor Co., Portland, Conn.

Apex—1, 1 1/2, 2 1/2, 3 1/2—Hamilton Motor Co., Grand Haven, Mich.

Armleder—1, 1 1/2, 2 1/2, 3 1/2—O. Armleder Co., Cincinnati, Ohio.

Atco—1 1/2, 2 1/2—American Truck & Trailer Corp., Kankakee, Ill.

Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.

Atlas—1—Atlas Truck Corp., York, Pa.

Atterbury—1 1/2, 2 1/2, 3 1/2, 5—Atterbury Motor Car Co., Buffalo, N. Y.

Autocar—2, 3 1/2, 5—Autocar Co., Ardmore, Pa.

Available—1 1/2, 2, 2 1/2, 3 1/2, 5, 7—Available Truck Co., Chicago, Ill.

Avery—1—Avery Company, Peoria, Ill.

Bartlett—7—Bartlett Truck Co., Chicago, Ill.

Beck-Hawkeye—1, 1 1/2, 2, 3—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.

Bell—1, 1 1/2, 2 1/2—Bella Motor Truck Co., Ottumwa, Ia.

Belmont—1, 1 1/2, 2, 3 1/2—Belmont Motors Corp., Lewistown, Pa.

Bessemer—1, 1 1/2, 2 1/2, 4—Bessemer Motor Truck Co., Grove City, Pa.

Birch—1—Birch Motor Cars, Chicago, Ill.

Bowman—3/4—Bowman Motor Car Co., Covington, Ky.

Bridgeport—1 1/2, 2 1/2, 3 1/2—Bridgeport Motor Truck Co., Bridgeport, Conn.

Brinton—2 1/2—Brinton Motor Truck Co., Philadelphia, Pa.

Briscoe—1—Briscoe Motor Co., Jackson, Mich.

Brockway—3/4, 1 1/2, 2 1/2, 3 1/2, 5—Brockway Motor Truck Co., Cortland, N. Y.

Buffalo—T T—Buffalo Truck & Tractor Corp., Clarence, N. Y.

C. T.—1, 1 1/2, 2, 3 1/2, 5—Commercial Truck Co., Philadelphia, Pa.

Capitol—1 1/2, 2 1/2, 3 1/2—Capitol Motors Corp., Fall River, Mass.

Case—2—J. I. Case Plow Works Co., Racine, Wis.

Chevrolet—3/4, 1—Chevrolet Motor Co. of Mich., Flint, Mich.

Chicago—1 1/2, 2 1/2, 3 1/2, 5—Chicago Motor Truck, Inc., Chicago, Ill.

Climber—1 1/2—Climber Motor Corp., Little Rock, Ark.

Clydesdale—3/4, 1, 1 1/2, 2 1/2, 3 1/2, 5—Clydesdale Motor Truck Co., Clyde, Ohio.

Collier—1, 1 1/2, 2, 2 1/2—Collier Motor Truck Co., Bellevue, Ohio.

Columbia—1 1/2, 2 1/2—Columbia Motor Truck & Trailer Co., Pontiac, Mich.

Commerce—1 1/4, 1 1/2, 2, 2 1/2—Commerce Motor Truck Co., Detroit, Mich.

Concord—1 1/2, 2, 2 1/2, 3—Abbott-Downing Truck & Body Co., Concord, N. H.

Corbitt—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Corbitt Motor Truck Co., Henderson, N. C.

Couple Gear—3 1/2, 6—Couple Gear Electric Truck Co., Grand Rapids, Mich.

Cyclone—1 1/2—The Cyclone Motor Corp., Greenville, S. C.

Dart—1 1/2, 2 1/2, 3 1/2—Dart Truck & Tractor Corp., Waterloo, Ia.

Day-Elder—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Day-Elder Motors Corp., Newark, N. J.

Dearborn—1, 1 1/2, 2—Dearborn Truck Co., Chicago, Ill.

Defiance—1, 1 1/2, 2—Defiance Motor Truck Co., Defiance, Ohio.

Denby—1, 1 1/2, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.

Dependable—1, 1 1/2, 2, 2 1/2, 3 1/2—Dependable Truck & Tractor Co., East St. Louis, Ill.

Diamond T—1 1/4, 1 1/2, 2, 3 1/2, 5—Diamond T Motor Car Co., Chicago, Ill.

Diehl—1, 1 1/2—Diehl Motor Truck Works, Philadelphia, Pa.

Doane—2 1/2, 3 1/2, 6—Doane Motor Truck Co., San Francisco, Cal.

Dodge—1 1/2—Dodge Bros., Detroit, Mich.

D-Olt—1 1/2—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.

Dorris—1 1/2, 3 1/2—Dorris Motor Car Co., St. Louis, Mo.

Double Drive—4—Double Drive Truck Co., Chicago, Ill.

Douglas—1 1/2, 2, 3—Douglas Motors Corp., Omaha, Neb.

Duplex—2, 3 1/2—Duplex Truck Co., Lansing, Mich.

Duty—2—Duty Motor Co., Greenville, Ill.

Eagle—2—Eagle Motor Truck Corp., St. Louis, Mo.

Erie—1 1/2, 2 1/2—Erie Motor Truck Mfg. Co., Erie, Pa.

F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.

Facto—2 1/2—Facto Motor Trucks, Springfield, Mass.

Fageol—1 1/2, 2 1/2, 3 1/2, 5—Fageol Motors Co., Oakland, Cal.

Fargo—2—Fargo Motor Truck Co., Chicago, Ill.

Federal—1, 1 1/2, 2, 3 1/2, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.

Ford—1—Ford Motor Co., Highland Park, Mich.

Forschler—1, 1 1/2, 2, 3—Forschler Motor Truck Mfg. Co., New Orleans, La.

Front Drive—1 1/2—Double Drive Truck Co., Chicago, Ill.

Fulton—1, 2, T.T.—Fulton Motors Corp., Farmingdale, N. Y.

G. M. C.—1, 2, 3 1/2, 5—General Motors Truck Co., Pontiac, Mich.

G. W. W.—1 1/2—Wilson Truck Mfg. Co., Henderson, Ia.

Garford—3/4, 1 1/2, 2, 3 1/2, 5, 7 1/2—Garford Motor Truck Co., Lima, O.

Gary—1 1/2, 2 1/2, 3 1/2, 5—Gary Motor Truck Co., Gary, Ind.

Gersix—1 1/2, 2 1/2, 3—Gersix Mfg. Co., Seattle, Wash.

Giant—1 1/2, 2 1/2, 3 1/2, 5—Giant Truck Corp., Chicago Heights, Ill.

Globe—3/4—Globe Motors Co., Cleveland, Ohio.

Gove—2 1/2—Gove Motor Car Co., Detroit, Mich.

Graham—1 1/2—Graham Brothers, Evansville, Ind.

Gramm-Bernstein—1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.

Hal-Fur—2, 3 1/2—Hal-Fur Motor Truck Co., Cleveland, Ohio.

Hall—2 1/2, 3 1/2, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.

Hawkeye—1 1/2, 2, 3 1/2—Hawkeye Truck Co., Sioux City, Ia.

Hendrickson—2 1/2, 3 1/2, 5—Hendrickson Motor Truck Co., Chicago, Ill.

Highway-Knight—4, 5—Highway Truck Corp., Chicago, Ill.

Higrade—1, 1 1/2—Higrade Motors Co., Harbor Springs, Mich.

Holmes—2—Holmes Motors Mfg. Co., Littleton, Colo.

H. R. L.—3/4, 1 1/2, 2 1/2—H. R. L. Motor Co., Seattle, Wash.

Huffman—1 1/2—Huffman Bros. Co., Elkhart, Ind.

Hurlburt—1 1/2, 2 1/2, 3 1/2, 5—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.

Huron—1 1/2, 2 1/2—Huron Truck Co., Bad Axe, Mich.

Independent—1 1/2, 2 1/2, 3 1/2—Independent Motor Co., Youngstown, Ohio.

Independent—1 1/2, 2 1/2—Independent Motor Truck Co., Inc., Davenport, Ia.

Indiana—1 1/2, 2, 2 1/2, 3 1/2, 5—Indiana Truck Corp., Marion, Ind.

International—1, 1 1/2, 2, 3, 5—International Harvester Co., Chicago, Ill.

Italia—2, 3, 5—Italia Motor Truck Co., San Francisco, Cal.

Jackson—3 1/2—Jackson Motors Corp., Jackson, Mich.

Jumbo—1 1/2, 2, 2 1/2, 3, 3 1/2, 4—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—1 1/2, 2 1/2, 3 1/2—Kalamazoo Motor Corp., Kalamazoo, Mich.

Kearns—3/4, 1 1/2—Kearns-Dughie Motors Co., Danville, Pa.

Kelly-Springfield—1 1/2, 2 1/2, 3 1/2, 5, 6—Hare's Motors, Inc., New York, N. Y.

Keystone—2—Keystone Motor Truck Corp., Philadelphia, Pa.

Kimball—2, 2 1/2, 3, 4, 5—Kimball Motor Truck Co., Los Angeles, Cal.

Kissel—1, 1 1/2, 2 1/2, 4, 5—Kissel Motor Car Co., Hartford, Wis.

- Kleiber—1, 1½, 2, 2½, 3½, 5—Kleiber & Co., Inc., San Francisco, Cal.  
 Koehler—1½, 2½, 3½, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.  
 Lange—2—Lange Motor Truck Co., Pittsburgh, Pa.  
 Lansden—¼, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.  
 Larrabee-Deyo—1½, 2½, 3½, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.  
 L. M. C.—2½—Louisiana Motor Car Co., Shreveport, La.  
 Lombard—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.  
 Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.  
 Luverne—2, 3—Luverne Automobile Co., Luverne, Minn.  
 Maccar—1½, 2, 2½, 3½, 5—Maccar Truck Co., Scranton, Pa.  
 MacDonald—7—MacDonald Truck & Tractor Co., San Francisco, Cal.  
 Mack—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.  
 Master—1½, 2½, 3½, 5, T.T.—Master Trucks, Inc., Chicago, Ill.  
 Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.  
 Menominee—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Menominee, Mich.  
 Moline—1½—Moline Plow Co., Moline, Ill.  
 Moreland—1½, 2½, 4, 5—Moreland Motor Truck Co., Los Angeles, Cal.  
 Mutual—2, 2½—Mutual Truck Co., Sullivan, Ind.  
 Napoleon—¼, 1, 1½—Napoleon Motors Co., Traverse City, Mich.  
 Nash—1, 2—Nash Motors Co., Kenosha, Wis.  
 Nelson—LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.  
 Netco—2, 2½—New England Truck Co., Fitchburg, Mass.  
 Niles—2—Niles Motor Truck Co., Pittsburgh, Pa.  
 Noble—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.  
 Northway—2, 3½—Northway Motors Co., Natick, Mass.  
 Norwalk—1, 1½—Norwalk Motor Car Co., Martinburg, W. Va.  
 O. K.—1½, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.  
 Ogden—1½, 2½, 3½, 5—Ogden Motor Truck Co., Chicago, Ill.  
 Old Hickory—1—Kentucky Wagon Mfg. Co., Louisville, Ky.  
 Old Reliable—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.  
 Oldsmobile—1—Olds Motor Works, Lansing, Mich.  
 Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.  
 Onelda—1½, 1½, 2½, 3½, 5—Onelda Motor Truck Co., Green Bay, Wis.  
 Oshkosh—2, 2½—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.  
 Packard—2, 3, 5—Packard Motor Car Co., Detroit, Mich.  
 Paige—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.  
 Parker—2, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.  
 Patriot—1, 2, 3—Patriot Motors Co., Lincoln, Neb.  
 Penn—2—Penn Motor Corp., Philadelphia, Pa.  
 Pierce-Arrow—2, 2½, 3½—Pierce-Arrow Motor Car Co., Buffalo, N. Y.  
 Pioneer—1—Pioneer Truck Co., Chicago, Ill.  
 Pittsburgher—2½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.  
 Power—1½, 3½—Power Truck & Tractor Co., St. Louis, Mo.  
 Premocar—1½—Preston Motors Corp., Birmingham, Ala.  
 Rainier—¼, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Flushing, L. I., N. Y.  
 Ranger—2—Southern Motor Mfg. Ass'n, Ltd., Houston, Tex.  
 Reliance—1½, 2½—Reliance Motor Truck Co., Appleton, Wis.  
 Reo—1½—Reo Motor Car Co., Lansing, Mich.  
 Republic—¼, 1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.  
 Reynolds—1½, 2½, 3½, 5—Reynolds Motor Truck Co., Mt. Clemens, Mich.  
 Riker—3, 4—Locomobile Co. of America, Bridgeport, Conn.  
 Rowe—1½, 2, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.  
 Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.  
 Samson—¼, 1½—Samson Tractor Co., Janesville, Wis.  
 Sandow—1, 1½, 2, 2½, 3½, 5—Sandow Motor Truck Co., Chicago, Ill.  
 Sanford—2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.  
 Schacht—2, 2½, 3½, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.  
 Schwartz—1½, 1½, 2½, 5—Schwartz Motor Truck Co., Reading, Pa.  
 Selden—1½, 2½, 3½, 5—Selden Truck Corp., Rochester, N. Y.  
 Seneca—¼—Seneca Motor Car Co., Fostoria, Ohio.  
 Service—1, 1½, 2½, 3½, 5—Service Motor Truck Co., Wabash, Ind.  
 Signal—1, 1½, 2½, 3½, 5—Signal Motor Truck Co., Detroit, Mich.  
 Southern—1, 1½, 2—Southern Truck & Car Corp., Greenboro, N. C.  
 Standard—1, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.  
 Steinmetz—¼—Steinmetz Electric Motor Car Corp., Baltimore, Md.  
 Sterling—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.  
 Stewart—¼, 1, 1½, 2, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.  
 Stoughton—¼, 1, 1½, 2, 3—Stoughton Wagon Co., Stoughton, Mich.  
 Success—2½—Webberville Truck Co., Webberville, Mich.  
 Super Truck—2½, 3½, 5—O'Connell Motor Truck Co., Waukegan, Ill.  
 Superior—1, 2—Superior Motor Truck Co., Atlanta, Ga.  
 Tiffin—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.  
 Titan—2½, 3½, 5—Titan Truck Co., Milwaukee, Wis.  
 Tower—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.  
 Traffic—1½, 2, 3—Traffic Motor Truck Corp., St. Louis, Mo.  
 Transport—1, 1½, 2½, 3½—Transport Truck Co., Mt. Pleasant, Mich.  
 Traylor—1½, 2, 3, 4, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.  
 Triangle—¼, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.  
 Triumph—1½, 2½—Triumph Truck & Tractor Co., Kansas City, Mo.  
 Twin City—F. W. D., 3½, 5—Twin City Four-Wheel Drive Co., Inc., St. Paul, Minn.  
 Twin City—2, 3½—Minneapolis Steel & Mach. Co., Minneapolis, Minn.  
 Ultimate—1½, 2, 2½, 3—Vreeland Motor Co., Inc., Newark, N. J.  
 Union—2½, 4, 6—Union Motor Truck Co., Bay City, Mich.  
 United—1½, 2½, 3½, 5—United Motors Co., Grand Rapids, Mich.  
 Ursus—1, 1½, 2½, 3½—Ursus Motor Co., Inc., Chicago, Ill.  
 U. S.—1½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.  
 Velie—1½—Velie Motors Corp., Moline, Ill.  
 Vim—¼, 1, 2, 3—Vim Motor Truck Co., Philadelphia, Pa.  
 Vulcan—2½—Vulcan Mfg. Co., Seattle, Wash.  
 Walker—1½, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.  
 Walker-Johnson—2½—Walker-Johnson Truck Co., Woburn, Mass.  
 Walter—5—Walter Motor Truck Co., New York, N. Y.  
 Ward—¼, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.  
 Ward La France—2½, 3½, 5—Ward La France Truck Co., Inc., Elmira, N. Y.  
 Watson—¼, 3½, T.T.—Watson Wagon Co., Canastota, N. Y.  
 White—¼, 2, 3½, 5—White Co., Cleveland, Ohio.  
 White Hickory—1, 1½, 2½—White Hickory Motor Corp., Atlanta, Ga.  
 Wichita—1, 1½, 2, 2½, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.  
 Wilcox—1, 1½, 2½, 3½, 5—Wilcox Trux, Inc., Minneapolis, Minn.  
 Wilson—1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.  
 Winther—1, 1½, 2, 2½, 3½, 5, 7—Winther Motor Truck Co., Kenosha, Wis.  
 Wisconsin (Loganville)—2, 2½—Wisconsin Truck Co., Loganville, Wis.  
 Wisconsin (Sauk City)—1, 1½, 2½, 3½—Wisconsin Farm Tractor Co., Sauk City, Wis.  
 Witt-Will—1½, 2—Witt-Will Co., Inc., Washington, D. C.  
 Wolverine—1, 1½, 2, 2½, 3½—American Commercial Car Co., Detroit, Mich.  
 Yellow Cab—¼, 1½—Yellow Cab Mfg. Co., Chicago, Ill.  
 Young—1, 2, 3½—The Young Motor Truck Co., Euclid, Ohio.

## Avoid Inspection; Avoid Profit!

**I**F there is inefficiency in the use of motor trucks, the trouble is traceable, ninety-nine times out of a hundred, to neglect," declared J. H. Werner, senior member of the truck distributing and service firm of Walker & Werner, 207 Fayette St., Peoria, Ill.

"Our greatest problem is to induce truck owners to issue a positive order to every driver to bring in his machine once a month for an inspection. This may seem a simple matter, and one that would bring universal co-operation. But the contrary is true. When we sell a truck, we impress upon the buyer the vital importance of monthly inspection and annual overhauling. We make this point as strong as possible and it is apparently absorbed with intentions to respect it. The first month, perhaps, the truck comes in and we look it over, suggesting possible attention. Although we make no charge for this inspection, yet we rarely see the truck the second time, until there is a complete fall down and heavy expense in overhauling that doubtless would have

been averted if the monthly inspection was lived up to.

"We do not believe in free service and allow none unless convinced that there was something defective in construction through faulty work at the factory. Our free service, as stated, is restricted to the monthly inspection we offer. If a truck comes in and our inspector looks over the machine and makes a report of what is

**Continuous Activity is the Reward Being Reaped by the Walker & Werner Service Station as a Result of Specialization in Truck Repair and Ironclad Rules Governing Monthly Inspection.**

needed, we mail this to the owner and, if he orders the work required, we charge him at the same rate as we would a truck owner who buys a machine elsewhere.

"We maintain a very complete repair shop and specialize in truck repair. We believe that if every truck owner would adopt the ironclad rule of monthly inspection and annual overhauling, the average machine would give greater efficiency, the period out of service reduced, and the life of the machine doubled. Hence, we urge adoption of such rules by owners."





# Metal and Rubber Markets

## Increase in Volume of Steel Tonnage Moving. No Great Improvement Shown, but Aggregate Business Encouraging

The news that all danger of a general railroad strike was passed has created a general and genuine sense of relief in steel circles, both buying and selling. It is not believed, however, that the late possibilities had any material effect upon the market except that for a few days it stimulated some small scattered business where the demand for prompt delivery was urgent and called for some releases upon contracts. The gross value of tonnage moving is not particularly heavy, but it is improving.

### Steel Products Prices

#### Per ton—Pittsburgh—

Bessemer billets .....	29 00 a 30 00
Open hearth .....	29 00 a 30 00
Forging billets .....	34 00 a 35 00
Sheet bars .....	30 00 a ....
Slabs .....	30 00 a 31 00

### Sheets

The following prices are for 100-bundle lots and over, f.o.b. mill:

#### Blue Annealed Sheets—

Pittsburgh (base) .....	2 25 a 2 50
Philadelphia .....	2 60 a ....
New York .....	2 63 a ....

#### Galvanized Sheets of Black Sheet Gauge—

Pittsburgh .....	4 00 a ....
New York .....	4 38 a ....

### Finished Iron and Steel

Tank plates, Pittsburgh .....	1 60 a 1 70
Tank plates, New York .....	1 88 a 1 98
Steel bars, New York .....	1 80 a 1 88
Steel bars, Pittsburgh .....	1 50 a 1 60

### Iron and Steel at Pittsburgh

Bessemer iron .....	21 95 a ....
Skelp, grooved steel .....	1 60 a 1 65
Skelp, sheared steel .....	1 60 a 1 65
Strip steel, cold .....	3 75 a 4 00
Strip steel, hot .....	2 25 a ....
Ferromanganese (78-82%) .....	60 00 a 65 00
Steel, melting scrap .....	14 50 a 15 00
Iron bars, refined .....	2 15 a 2 25

### Miscellaneous Metals

Copper sheets .....	20 50 a ....
Copper rolls .....	19 00 a ....
Copper bottoms .....	28 00 a ....
Copper rods .....	19 00 a 19 75
Seamless tubing, bronze.....	20 50 a ....
Seamless tubing, copper.....	20 50 a ....
Seamless low brass tubing.....	19 50 a ....
Seamless high brass tubing.....	18 00 a ....
High brass sheets .....	16 25 a ....
High brass rods .....	14 25 a ....
Low brass sheets .....	17 75 a ....
Low brass rods .....	18 75 a ....
Brazed tubing, brass .....	25 00 a ....
Brazed tubing, bronze .....	29 75 a ....
Brazed tubing, copper .....	29 75 a ....

**Antimony**—Demand continues quiet and the market remains easy. Expected arrivals have a depressing effect upon the market.

**Manganese**—The position of the market shows no improvement. Demand is very quiet.

**Old Metals**—Very little improvement can be expected in the markets for aluminum and copper scrap before conditions in the virgin metal become more stable. Consumers are looking for bargains and dealers for an advance in the near future. Lead is steady.

Following are the latest buying and selling prices f. o. b. cars New York:

Aluminum—	Buying	Selling
Cast scrap .....	8 a 8½	9 a 9½
Sheet scrap .....	8 a 9½	8½ a 9½
Clippings .....	11½ a 12	13 a 14

#### Copper—

Heavy machinery comp..	7¼ a 7½	8¼ a 8½
Heavy and wire .....	9 a 9½	10¼ a 10½
Light and bottoms .....	7½ a 8	8¼ a 8½
Heavy, cut and crucible..	9½ a 10	10¼ a 11¼
Brass, heavy .....	4¼ a 4½	4¼ a 5
Brass, casting .....	5¼ a 5½	4¼ a 6¼
Brass, light .....	3¼ a 3½	4 a 4¼
No. 1 cl. brass turnings..	4 a 4½	4¼ a 4¾
No. 1 comp. turnings....	5¼ a 6	6¼ a 6½
Solder joints .....	4¼ a 5	5¼ a 5½
Pewter dishes .....	15 a 16	17 a 18

### Rubber Easy

Although there was no particular pressure exerted by holders of plantation rubber to effect sales the market was easy and fractionally lower for all positions, including spot and nearby, which for some days had resisted the general declining tendency.

Para—Up-river, lb. ....	22½ a 23
Up-river, coarse .....	.. a ..
*Island, fine .....	21½ a ..
Island, coarse .....	16¼ a ..
*Cameta .....	10¼ a ..
Amber—No. 1 .....	16 a ..
No. 2 .....	15½ a ..
No. 3 .....	14½ a ..
Smoked ribbed sheets .....	16¼ a ..
*Centrals—Corinto .....	.. a 11
*Esmeralda .....	.. a 11
*Mexican scrap .....	.. a 10
*Guayule, wet .....	.. a 20
*Guayule, dry .....	.. a 26
*Balata, block, Trinidad.....	.. a 59
*Balata, block, Colombian....	.. a 32
*Balata, Panama .....	.. a 35
*Balata, sheet .....	.. a 63

\* Nominal.

**Scrap Rubber**—The market remains in a state of waiting for further improvement in crude rubber and industrial conditions directly affecting this branch of trade.

Inner tubes, No. 2 .....	.. a 2
Inner tubes, No. 1 .....	.. a 4¼
Tires, automobile .....	½ a ..

## Chinese Truck Order Denied

Current reports that the Chinese Government was in the market for 3300 trucks and had closed a deal with a Canadian firm were denied by the Automotive Div. of the Dept. of Commerce in a communication to the N. A. C. C.

Merchants and officials in Shanghai were specially interviewed on this subject by U. S. Commercial Attaché at the cabled request of this newly created division. They were of the opinion that the

number of trucks reported sold to Shanghai Motor Co. was entirely out of proportion to the present market demand; furthermore, that the Chinese Government had no funds available for subsidies to encourage motor truck transportation.

The Automotive Division, which was created by Secretary Hoover co-operatively with manufacturers in accordance with his plan of commodity groups, is now functioning and prepared to render prompt and adequate service to the motor industry.

### Special Body Construction Facilitates Distribution and Installation of Window Displays.

The facility with which an advertising representative can make the rounds of various stores from branch offices in connection with the installation of window displays and delivering kindred advertising matter with this specially designed body not only expedites but makes more thorough his work. This job was designed and built by the Service Motor Truck Co., Wabash, Ind.



# Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

THE COMMERCIAL CAR JOURNAL																								NOVEMBER 15, 1921											
40 x 8												42 x 9												44 x 10											
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## Motor Transportation Will Profit by Passage of Good Roads Bill

Washington, November 10. The passage and approval of the new Federal aid good roads bill is being hailed by friends of the highway movement generally at Washington as a big step towards the development of motor transportation, commercially and otherwise, particularly with the coming of the new year. As indicating the interest felt in congressional circles in highway motor transportation, a bill just introduced by Senator Morris Sheppard, of Texas, is an example. Senator Sheppard's measure creates a National Highway Motor Transportation Board, the membership to be made up of the Secretary of War, the Attorney General, the Secretary of Agriculture, the Secretary of Commerce and the chairman of the Interstate Commerce Commission.

It would extend to corporations, formed for the purpose of operating a highway transportation route at least fifty miles in length, financial support from the government somewhat as is provided under the Federal aid roads bill to the states in the construction of highways. Financial assistance would be dependent upon the substantial character of the organization. The bill provides that when such corporation has established itself satisfactorily, application may be made to the board, over verified signatures of the stockholders of the corporation, for a government subscription equal to the last fourth of the capital stock of the corporation remaining unsubscribed.

It is further provided that the amount paid for such government stock shall constitute a loan from the government to the corporation, repayable with interest at the rate of 5 per cent, in ten annual installments. The first installment shall be due five years after date of subscription. Repayment of the total amount advanced, including interest, is to be guaranteed under bond. The government board would not be authorized to subscribe to the stock of more than six such corporations within any one state, territory or the District of Columbia.

An appropriation of \$7,200,000 is authorized to carry out the purposes of the Act.

## Steinmetz to Produce in December

The Steinmetz Electric Motor Car Corp., of Baltimore, the latest newcomer to the electric truck manufacturing ranks, has appointed George Drake Smith as general sales manager. Mr. Smith is well known in the truck field, having recently been vice-president, director and general sales manager of the Winther Motor Truck Co., Kenosha, Wis. He was at one time with the General Vehicle Co., and later with the Edison Storage Battery Co., Orange, N. J.

The Steinmetz corporation, under the direction of Dr. Charles P. Steinmetz, the electrical genius, have been experimenting for several years and will be in production by the first of December.

# Taken From Current House Organs

## We're Victims of Ennui

Pardon me, but I can't shake the feeling that ennui (which is the Boston word for laziness) has a helluva lot to do with the present state of business.

You know, we had four or five years of mighty fine sledding, during which time most of us forgot the finer points of the gentle art of selling. More business was handed to us than we wanted—more than we could take care of. Some of us turned up our noses at old friends, and we made no effort to form new and better business friendships. We made loads of money, and spent it; it was the old story of "come easy, go easy."

And here we are: High and dry! Bewildered—discouraged—lazy; that is, many of us are. We can't find business—we've lost our energy, our hopes, our ambitions. We've lost ourselves. We're listless victims of ennui.

Thank heaven that is not true of all of us. There are still some Go-getters who never laid down, and there are some who were down but who jumped up at the count of nine and are still fighting.

Fighting for business—and getting it. You know it.

The naked truth is that there is a considerable volume of business being done right now.

It's going to the Go-getters—the fellows who have not forgotten how to solicit trade.

It's going to the chaps who get orders by going after them. The days of "accepting" orders are passed.

Business—regular business—is coming back. It's bound to. The Go-getters will bring it back—in spite of the croakers, the discouraged, the lazy cusses who have done and are doing all they can to make a bad mess worse.

The Go-getters are the harbingers of better times, when we'll all be busy and happy. Encourage them—go any length to help them. But for the love of Pete be careful not to spoil them by permitting, by suggesting, by countenancing anything but legitimate business.

We have all had time to do a lot of thinking.

Let's go out and do a lot of doing.

Let's join hands with the Go-getters.—*Driver Dan*, Sterling Motor Truck Co., Milwaukee, Wis.

## Co-operative Truck Hauling Among Farmers

Farmers thinking of establishing a co-operative truck line should first study the present cost of transportation of their commodities and then obtain a comparative basis of reckoning as to truck shipments of the same products. The approximate daily tonnage available for shipment should be known before it is possible to operate a truck line at a profit. There must be a dependable arrangement with farmers by which they will avail

themselves of the truck shipping route and not desert the operator at the crucial time. It has been found that truck shipping should not be more than forty miles to market. This is the maximum at which the United States Department of Agriculture has found it profitable and dependable to operate truck routes. Of course, there are exceptions where special interests are served. The point to be remembered is that a truck to pay must be kept going the maximum amount of time. All idle time is a total loss.

Establishing a motor truck route requires business ability. Only men who have proved their ability should be considered eligible to establish farmers' truck routes. There must be a thorough understanding of the requirements on the part of each farmer who is expected to supply the route with products. There can be no chance element about a truck route or it would fail to pay. The actual output of all commodities to be shipped by truck should be known to the truck line operators. There should be a system of distribution over a period of time in a manner so that the trucks on the route can take care of the business to best advantage and not neglect any commodity which should reach market by a specified time. The county agent should be taken into consultation on this project and should help to make working plans which will serve the whole community.—*Acme Angles*, Acme Motor Truck Co., Cadillac, Mich.

## Just a Spoonful of Pep

"Jones' work surprises me," remarked one of our men the other day, while we thumbed through the mail orders. "Jones gets results, where others fail."

The reason is evident in Jones' correspondence. It's more apparent when he talks to you. Jones aims straight. He knows what he wants and keeps after it until he gets it.

No matter what qualification a man lacks, his ability to intelligently follow out a definite plan and "stick to it"—gets results.

Jones carries a catalog showing over two hundred stock articles. If he tried to sell them all he would cultivate failure. Instead he analyzes his customer's needs. Jones concentrates his efforts to find out why his merchandise is most valuable to the buyer. When Jones gets the solution, he convinces the customer.

After the first order, the second follows more readily and soon Jones has secured a valued account. Although he specializes in selling one or two articles, his methods quickly undermine competition and his general line sales hold up surprisingly well.

Each of us can improve our sales methods by following Jones' plan. If we mentally itemize the reasons why a particular article is most valuable to a buyer and follow a deal closely, we usually can

get the order. Remember that aside from quality, price and shipments, many buyers are influenced to place business by other sales points.

Jones secured a most important account by emphasizing the convenience to the buyer of phoning his order. Every time he visited this particular buyer's office he demonstrated by picking up the telephone on the buyer's desk—how easy it would be to place orders with Jones.

Jones gets difficult business with less effort than any man in his Company's employ. He uses his head. His orders prove it. That's why Jones is slated for promotion.—*Tank News*, Milwaukee Tank Works, Milwaukee, Wis.

## There is a Limit at Which Tires Can be Sold and Quality Maintained

This is the time of the year when each dealer must analyze the line of tires which he expects to tie to for the coming year and in making this analysis, it behooves him to analyze the condition of the company manufacturing the tires, as well as the tires themselves and to also be very careful in his selection of a line that he knows will give service to his trade.

We all know that we can buy a suit of clothes made of all wool fabric at a certain price, but when we get below this price and attempt to buy a suit, we also know that this suit will contain a certain per cent of cotton. Therefore there is a limit to price.

One thing that tire dealers of the United States should be careful of is not to endeavor to break down prices entirely, for this simply means that they will be buying tires of a quality based entirely upon price. We all know that it is impossible to quote a price upon an article made of pure gold as low as the same styled article of practically the same appearance, made of brass, and that is exactly what the dealers must guard in their tire buying.

In other words, anybody knows that it is impossible to sell a 30 x 3½ tire to the consumer at \$10.00 that will contain the material or render the service that the same sized tire would, listed at the extremely low price of \$13.50, or \$13.95, as sold by many reputable manufacturers.

Every manufacturer today is selling goods just as close as they possibly can be sold. The idea of profits has been lost and therefore, in a market as sensitive as the present market is, there will always be some manufacturer whose object is to under-sell rather than to maintain their good name and good quality.

The Mason policy is to at all times quote the lowest price that can possibly be named for Mason quality, but this quality will not be changed in order to meet competition of less serviceable tires.—*Mason Mail*, Mason Tire & Rubber Co., Kent, O.



# TRUCK DRIVERS BLAZE WAY FOR OWNERS OF PASSENGER CARS

**Manufacturers Have Found That Transport Workers Are Several Laps Ahead of Motor Car Drivers in Realizing the Importance and Value of Closed Car Models**

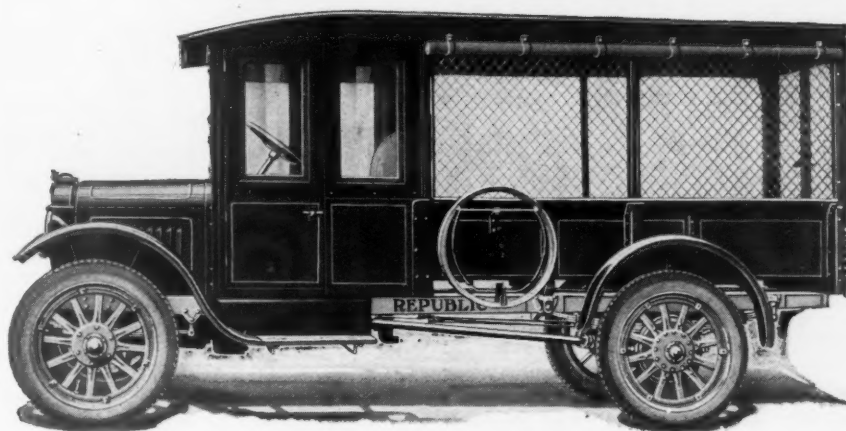
**T**HE keynote of the 1921 automobile shows was the almost universal prediction by manufacturers that the passenger car business of the year would show a greatly increased demand for closed cars. All manner of predictions were made, but the average of estimates submitted showed an almost universal opinion that the closed car demand would be at least equal to the open car sales and might surpass the latter.

If at that time any one had ventured the statement that the truck drivers showed an even greater appreciation of the closed driver's seat than did the passenger car owner, he would have been smiled upon and pleasantly told the man with the corrugated neck never did appreciate comfort and value in motor vehicle design and probably never would until his passenger car neighbor on the highway pointed the way for him.

As sales and production schedules have worked out this year, it is becoming painfully apparent to the passenger car manufacturers that the huskies who drive America's trucks have given a very excellent example of pace setting in motor vehicle styles.

And the passenger car manufacturer is beginning to realize it.

If the truth were known, it is probable that many of the marked reductions in price this year in closed type passenger cars were due in great degree to the fact that manufacturers were overstocked with closed car bodies and finishing materials. In a falling market heavy losses were taken to get cars into customers' hands.



**This Republic Rapid Transit Model With the Closed Cab Guarding the Driver; the Goods Protected by Curtains and Screened Sides, Defies the Encroachments of Both the Elements and Marauder**

In many cases passenger car production schedules in the first months of the year were so divided in specification that the planned output was to be approximately fifty per cent closed and fifty per cent open jobs. Along about March these schedules underwent a sharp revision and by summer production on closed cars was at a standstill in practically every factory.

In September and October, because of the marked reductions in price, production again was increased on all models, but from a comparative standpoint the increase in closed car output was most marked.

But throughout the year the demand for closed car jobs in trucks has shown that

the time is not far distant when practically every truck on the road will be a closed type model. Of course, the light delivery wagons, the speed trucks and the larger trucks in the South will be for the most part of the fore-door open cab type. It is but natural that in city delivery work and on short hauls the drivers would prefer a truck giving the maximum in vision and also ready access.

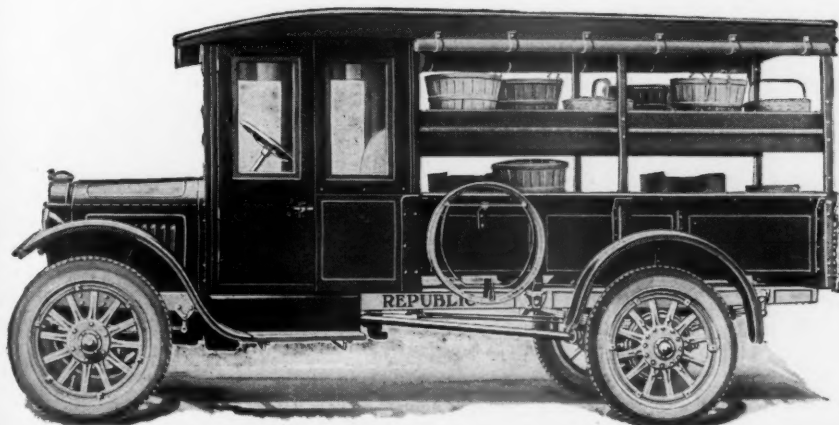
The closed cab truck demand has been felt by most of the truck manufacturers. In particular it has been noted by the Republic Truck Sales Corporation, which has specialized in body design and construction.

Col. Frank E. Smith, vice-president and general manager of Republic, has been interested in a study of the viewpoints of average truck drivers. In discussing this phase of truck sales, he said:

"In recent years it has become an established sales fact that the drivers have the last word on what truck shall be purchased. It has been but natural then that we should be at great pains and expense to study the likes and dislikes of truck drivers that we might give them in our product just what they want.

"The average truck driver may be considered a hardy, happy-go-lucky individual, who rather glories in bucking the elements and who, as the old song goes, 'doesn't care if it hails, rains or freezes.' But that is not a true picture of your truck driver of today.

"Truck drivers are not a class apart from any other group of thinking workmen. He doesn't like to sit in a draft any better than anyone else. And he is look-



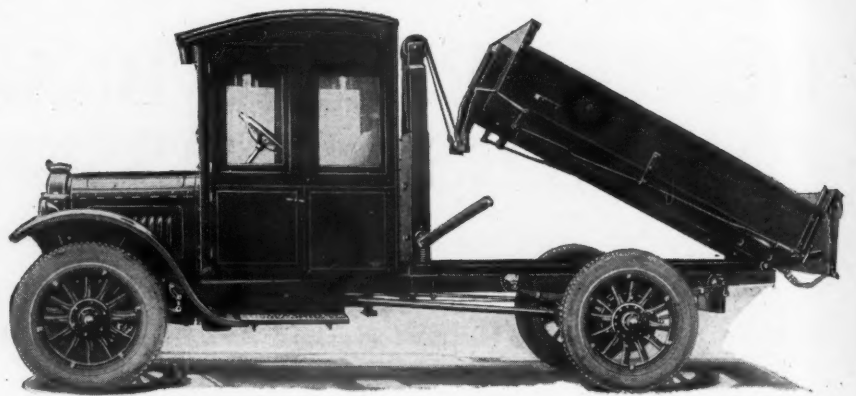
**This Fast Delivery Truck is Designed for the Truck Farmer, Grocer or Jobber**  
All drivers are showing a marked preference for the comfort and snugness of closed cabs.

ing for just as much protection as he can get from the weather just so long as it does not interfere with his safety and his ease in accomplishing the work at hand.

"He has found, for instance, that cold-breeding drafts do not play around his head if he keeps the back of his seat and one side closed. On this principle he has been the first to recognize the value of a good tight curtain which can be stretched tightly across the opening to his left hand on an open cab job.

"It is because he can best control ventilation that he has come to look with greatest favor upon the closed cab job as the ideal all-year round truck. He has found that in warm weather he gets plenty of change of air by fastening back one of the side doors, after dropping its glass window into a pocket, or protecting it by some other simple means. In most cases he will open the door on the right.

"It is interesting to notice that the truck driver has a better knowledge of how best to ventilate his car than does the driver of a large number of closed passenger cars we see on the road. It is no unusual thing to see sedan owners speeding along with windows open in opposite doors. As a result, the interior of the car is a whirlpool of drafts. As a rule, these drafts or currents of air seem



Although the Dump Body is Made With Open Cab It Has Been Found That Drivers Prefer in Most Instances the Closed Cab

to circulate in such manner that they hit the passengers either on the front or back seat squarely in the back of the neck. Many a stiff neck has followed a long drive in a closed car.

"There is every reason why the truck driver should have a warm, snug cab in all seasons. He very often aids in the work of loading and unloading his truck. And then, perspiring from his exertions, he swings into his seat, relaxes and starts on a drive. He is the favorite right then for the attacks of the cold germs, unless he understands the principles of correct

ventilation and sees to it that his body cools naturally and without being exposed to heavy drafts.

"In the truck lines running from a ton and a half upward, the closed cab has come to stay—and probably it has come to the exclusion in great degree of the open cab type.

"The Republic policy in the merchandising of trucks is based on the selling of trucks strictly along vocational lines. This plan is made practical in view of the company's complete line of bodies to meet hauling conditions in all lines."

## Transportation as Related to Speed Trucks

### Interesting Data as to the Type of Engine Most Adaptable to Light Delivery Trucks

**W**HEN the first 50,000 miles of railways were built in the United States many self-appointed prophets predicted the collapse of the railways, because sufficient passenger and freight business could never be developed to keep the roads running. These dire predictions were repeated until they fell of their own weakness. The public had come to realize that transportation is one of the prime factors in maintaining the nation's growth.

This fundamental human need for transportation has opened up new uses for the motor truck. Its ever increasing utility has greatly accelerated the adoption of motorized transportation by business and industry.

The development of the motor truck brought with it a multiplicity of transportation problems which had to be solved. The same type of truck cannot fill every need, nor can the same engine, nor even the same type of engine answer for every truck.

City and suburban delivery presents a more complicated transportation problem than long distance truck haulage. In the latter case, ton mileage is easier to figure, because the problem is largely one of capacity load at a relatively uniform speed over considerable distances.

The light delivery truck problem in the city and suburban work calls for a wider range of speed with quick get-away and a variable load factor which, however, is seldom so great as to seriously affect the greater flexibility required of the speed truck.

To make the light commercial car practical, it must be rugged and economical to operate. The constant starting and stopping lay severe burdens on the driving mechanism, especially on the engine.

It is, therefore, natural that the four-

cylinder engine is in almost universal use in this type of commercial vehicle, because of its simplicity and economy and the ease with which it can be taken care of.

In this connection the Lycoming Motors Corp., Williamsport, Pa., offers either its model "K" or "KB" four-cylinder engine as being particularly adaptable to this type of service. A complete description of, and an outline of, factory recommendations for overhauling Lycoming engines appeared in the May COMMERCIAL CAR JOURNAL, page 41.

### Intensive Road Test for Illinois

Within the next few months a new road 2½ miles long is to be broken up in what is probably the most extensive study of road service ever undertaken in this country. The road is located in Illinois, about twelve miles southwest of Springfield, and parallels the Wabash Railroad.

In this road there are seven general types of paving, the idea being to have represented the chief materials used in road making so that the engineers may

study the effect of known and measured traffic of varying degree upon each kind of road.

The Illinois Department of Public Works and Buildings, in co-operation with the Bureau of Public Roads, U. S. Dept. of Agriculture, has constructed the road and will carry on the experiments. It is planned to subject the highway to a rigidly controlled truck traffic. The trucks are to be weighed and the weights gradually increased from a light load to one 50 per cent greater than that allowed by the Illinois laws.



## Activities of the Motor Truck Association of Philadelphia

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THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

**A**N offer of between four and five thousand motor trucks for general transportation uses in the event of a nation-wide railway strike was made to Governor Sproul by the dealer and owner members of the Motor Truck Association of Philadelphia at their first monthly meeting of the season at the Hotel Adelphia, on Wednesday night, Oct. 19.

The offer was made in the form of a resolution presented by the secretary, W. H. Metcalf, and was unanimously adopted and sent to the Governor immediately. The association comprises some 840 members, including dealers and owners in Pennsylvania east of Altoona, and of that number 405 are owner members, some of them owning large fleets of trucks. There are some 16,000 owners of trucks in that part of the State, and 26,000 throughout the State, owning some 60,000 trucks, and it is estimated that a very large percentage of all of these would be available for emergency use in case of a railway strike.

The meeting was presided over by Charles J. Swain, vice-president of the Association in the absence of the president, Mr. Anthony. Secretary Metcalf stated that he had sent letters for the Association to Senators Penrose and Smoot urging the passage of a revised tax bill to relieve business of discriminatory war taxes and also sent letters to fourteen members of the finance committee of Congress on the same subject.

Mr. Metcalf also read a letter from Benjamin G. Eynon, Registrar of the State Highway Department, urging motor

truck owners to apply for their 1922 licenses at once, so they might be issued before December 31, as there will be no extension of 1921 licenses after that date. The Engineer's Club invited the Association to meetings on highway construction on October 20 and 21, at their rooms, 1217 Spruce St.

An interesting review of the work of the State Highway Department was given by Thomas R. McDowell, field representative of the State Highway Department of Pennsylvania, who said that the work of the Department during the past three years had placed Pennsylvania in the front rank of states in road construction, as Pennsylvania had an improved road construction of over 9000 miles and a total of 10,235 miles of improved road connecting up with the state highways and running between county seats and the larger cities. Thirty-five per cent of these roads he said were on the primary system and 65 per cent on the secondary system. He said there are now 4920 miles of concrete road in the State, of which 550 miles have been laid this year. The high cost of construction, which however had declined somewhat, he said, had prevented the building of more roads. Mr. McDowell stated that they are now building to standard specifications of 18 ft., with a depth of 8 in. at the crown, and 6 in. at the edge, all reinforced, as it was found necessary to build the roads wider and thicker to stand present traffic loads. For next year there is available \$12,000,000 out of the \$50,000,000 bond issue for road construction work, but when that is spent

there will be no money in sight until 1925, before which time the proposed new \$50,000,000 bond issue cannot be authorized.

Mr. Samuel P. Leeds, president of the Atlantic City Chamber of Commerce and a leading authority on road work, spoke of the high cost of road construction in New Jersey, as compared with costs per mile in this State. He said the principal things to consider in road construction are the kind of foundation, the importance of the road to the State system, the permanence of the type, the kind of available material in the locality and the cost. He said that the maintenance and construction of roads was the next biggest problem to motor truck men after that of selling their product.

The Association members showed that they were in good musical form under the leadership of Howard Armstrong, their musical director.

### Free Auto Courses in New York

Free courses in gas engine mechanics and auto repairing and ignition and lighting (automobile) are being offered by the city of New York through its evening school system. These courses are open to those employed in some branch of industry and the instruction given is supplementary to day-time occupations, the aim being to fit the individual for greater earning capacity. Classes opened September 19.



### Municipal Authorities! Look Into This Proposition

This is the system used in Peoria, Ill., to dispose of municipal waste. Small trucks, each equipped with a light-wagon trailer is assigned to various districts of the city. At an appointed time these trucks bring their refuse to a central station where they are relieved of their load by a larger truck which can haul as high as six trailers to the dumping grounds. The use of this system has greatly reduced the operating expenses of garbage disposal.

# Latest Trolley Bus Development

**A**S a result of much study and experimentation on the part of the Detroit City Commission, the Packard Motor Car Co. and the Westinghouse Electric & Manufacturing Co., a new development in passenger bus operation recently made its debut in a series of successful demonstrations held in the city of Detroit.

This new development is an improved, electrically-driven, trackless trolley capable of transporting a minimum of 30 passengers and of attaining a speed of more than 25 m.p.h. The body is approximately 24 ft. long and 8 ft. wide, and the complete weight of the bus is 11,500 lb., of which 6770 lb. is carried on the rear axle. The acceleration of the vehicle is smooth and rapid.

It was capable of operating at a high rate of speed, even though the center of the vehicle was over 10 ft. to the side of a point directly beneath the double contact wires. The vehicle could dodge large trucks directly in its normal path, or draw up to the curb to receive or discharge passengers with surprising ease.

The application of power and the braking are both accomplished by foot controls, thus leaving the operator's hands free for driving and for opening and closing the door. The bus is made to run at two speeds, the first about 15 miles an hour and the second about 25. The power can be varied quickly and positively through the use of the foot controls.

Contrary to previous design, the trolley bus follows gasoline bus design rather than street car design. The chassis is of standard Packard type ED design with such omissions as are necessary to accommodate electrical instead of gasoline equipment. The propulsion equipment consists of two 25 hp. Westinghouse ball bearing safety car motors mounted in tandem and coupled together and to the propeller shaft with flexible couplings.

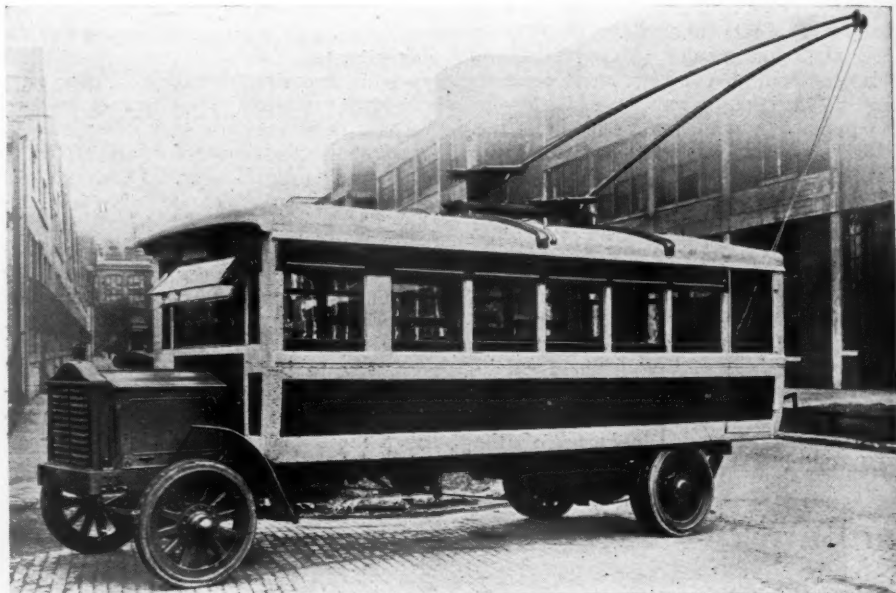
The front axle is a drop forging of the conventional "I" beam section. The steer-

ing knuckles are of the inverted yoke type. The rear axle is a built-up structure arranged so that the weight of the vehicle is carried on heavy steel tubes fastened to the housing. The torque of the propulsion motors is transmitted through the propeller shaft to the worm with a total gear reduction from the motor to the wheels of  $7\frac{3}{4}$  to 1. The worm, which is mounted directly above the worm-wheel and the differential, are mounted as a unit in a cast steel carrier bolted in place in the center housing of the axle. The axle drive shafts are arranged so that they transmit torque only and do not carry any of the direct load. Tubular radius rods remove driving strains from the springs. The service brake consists of two contracting shoes operating on a single drum at the rear of the transmission. The emergency brake consists of two sets of internal expanding segments acting on steel drums on the rear wheels. The wheels, which are equipped with special rubber cushion tires, are 34 in. in diam.

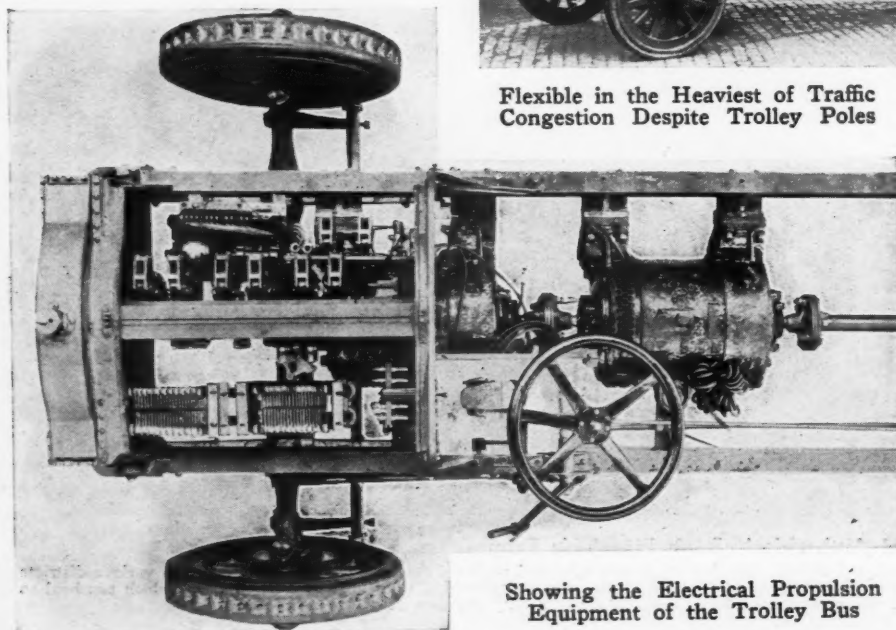
The foot operated control is arranged

for automatic acceleration. The notches are provided on the foot controller so that it is possible to arrest the controller at a slow or "switching" speed for travel in dense traffic or at the series of half-speed position. On account of variations in tractive effort required, a unique control operating scheme has been devised. The unusual grade and load conditions to be met may necessitate that some accelerations be made at double the normal accelerating tractive effort. A small motor driven sequence switch controls the operation of the resistance notches as well as the transition from series to parallel, while the speed of this small sequence switch motor is directly affected by current in the propulsion motors.

The control apparatus includes two small electrically operated line switches complete with overload trip, six small resistance and transition switches, a foot controller, a manually operated reverser, a motor cutout switch and a set of starting resistors. All of this apparatus is mounted beneath the usual engine hood, the resistors being mounted on one side of



Flexible in the Heaviest of Traffic Congestion Despite Trolley Poles



Showing the Electrical Propulsion Equipment of the Trolley Bus

the center line whereas the circuit interrupting devices and other important control items are located on the other side where they are ventilated, yet protected from the weather. The partition dividing the hood into two compartments is of a heat resisting insulating material which acts more or less as a switchboard for the control apparatus. The reverse lever and overload reset lever projects through the dash at a point convenient to the driver.

The current collecting device consists of two separate wheel trolley bases with 18 ft. poles, swivel harps and 5 in. diam. trolley wheels having U shaped grooves. The trolley bases are both mounted on the longitudinal axis, one 30 in. back of the other, the front base being elevated 10 in. above the rear base. This arrangement with the running board approximately 11 inches from the ground permits of a comparatively large "cruising radius."



## Crane-Mounted Truck for Special Contractors

**A** NEW field of endeavor opening is the business of handling materials for industrial plants, contractors and others on a contract basis. Just as large trucking companies have been built up on the business of hauling materials, so are these companies that realize the opportunities in the service bound to thrive. Now more than ever before, when men are analyzing their business and see the large per cent of their gross earnings paid to handle their materials, is the time to start.

Many material handling machines have been developed by the needs of industry. Probably first among the machines developed that will meet the varied conditions are the, light gasoline or electric driven locomotive type cranes.

A light crane that can be mounted on a motor truck or trailer can get from job to job economically and at motor truck speed and can do a great deal more work per day than the more cumbersome slow moving types.

Many medium sized industrial plants have a coal unloading problem, but not sufficient to justify the purchase of a crane, as the investment charges would have to be divided by too few tons of coal. A company may have to handle their material by expensive methods rather than by machine which will do it faster and be idle much of the time, but one crane signed up to do the necessary work for several companies can be kept busy all the time, can do the work more economically and yet earn a good return.

Specially designed light cranes are adaptable to fit general working conditions and have the flexibility and dependable construction for this work. Such cranes can be mounted on motor trucks, rubber tired trailers, steel wheel industrial trucks,

continuous tread, railroad flat cars, barges, etc.

The mountings best suited to contract material handling would be the motor truck or trailer. In the case of either truck or trailer mounting no outriggers are required for stability of the machine. Stirrups from the crane frame hang under the rear axle with cushion blocks to take road shocks and a small jack screw on each side of crane screws down quickly by hand to rest on the truck spring over the axle. This prevents the crane from rocking on the truck springs during operation. The trailer mounting is provided with its own travel gear for getting around yards under its own power. The Universal Crane Co., Swetland Bldg., Cleveland, O., is a manufacturer of such a crane. The following is a brief outline of this product.

It is a high speed, full rotating compact unit driven by its own heavy-duty gasoline engine with large reserve power. It handles a 1/2-yard grab bucket or 36-in. lifting magnet and a generator for exciting the magnet can be attached. The design follows the best standard heavy crane practice, and by use of the high grade materials the whole unit is claimed to stand up under the heavy and constant crane work. Parts and clutches are interchangeable and arranged for easy inspection. Bronze bushings are used throughout.

Only one man, who need not be a licensed engineer, is required for operation. The crane consumes but 10 to 15 gal. a day.

The crane will ordinarily, depending on where and how it has to work, unload a car of coal or pig iron in one hour and should make about three trips a minute with bucket or magnet, on general handling work.



Showing a Universal Crane Which Has Been in Use for Over a Year in Public Utility, Building Supply, Coal Service, Foundry Service, Etc.

## Florida Holds Convention and Show

Unexcelled in the history of automobile shows in Florida was the unanimous verdict at the conclusion of the fifth annual passenger car, truck, tractor and accessory show given in Jacksonville, Fla., October 3 to 8 by the Jacksonville Automobile Dealers' Association. Of a like success was the third annual convention of the Florida Automotive Dealers' Association, October 5 and 6. A number of prominent speakers, including Giles L. Wilson, of the Florida National Bank; Ernest Amos, State comptroller; Major Quimby Melton, W. E. Gardner and Mayor John W. Martin, of Jacksonville.

At the last day's session C. Williams, of Jacksonville, was elected president. Orlando was named as the convention city for 1922.

## Statement of Ownership, Management, Circulation, Etc.

Required by Act of Congress of August 24, 1912

Of COMMERCIAL CAR JOURNAL, published monthly at Phila., Pa. for October 1, 1921

State of Pennsylvania

County of Philadelphia, ss.:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMERCIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:  
Publisher, CHILTON COMPANY, 49th and Market Sts., Philadelphia, Pa.  
Editor, James Artman, 4538 Chestnut St., Philadelphia, Pa.  
Managing Editor, Albert G. Metz, So. Ardmore, Pa.  
Business Manager, C. A. Musselman, Merion, Pa.
2. That the owners are:  
James Artman, 4538 Chestnut St., Philadelphia, Pa.  
George H. Buzby, Wellington Apartments, 19th and Walnut Sts., Philadelphia, Pa.  
C. A. Musselman, Merion, Pa.  
A. H. Vaux, Penllyn, Pa.
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders, who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES ARTMAN, Editor.

Sworn and subscribed before me this 21st day of September, 1921.

(Seal) HARRY SMITH.  
(My commission expires March 7, 1925.)

# Trailers Materially Reduce Transportation Costs in California Fruit Handling

## Initial Trailer Expenditure Minor Detail When Compared With Increased Hauling Profits



Showing Manner in Which Trailers Are Employed in the Transportation of California Fruit

**M**ANY fruit growers are finding the trailer and semi-trailer one of the most useful pieces of farm equipment. Trailer transportation in conjunction with motor trucks is but in its infancy, the underlying principles, however, are practically the same as motor truck transportation, the efficiency of the trailer depending in a great measure upon the road and grade conditions.

A large percentage of motor truck transportation of fruit in California is handled on the wonderful network of highways that exist there, which, owing to their concrete or asphalt construction, and with grades that rarely exceed five per cent, lend themselves to the profitable use of trailers.

In most cases the average truck can easily double its carrying capacity through the use of trailers, thereby doubling the income of the truck itself, and in many instances tripling the rated carrying capacity of the truck.

Numerous instances have been cited where one motor truck with trailers has moved an entire carload of material at one trip. It can be easily seen that this newer method of transportation, with the development that is under way, in bringing trailers more forcibly to the attention of the motor truck buying public, will be by far the cheapest method known, inasmuch as fruit can be delivered directly from orchard to cannery at one handling, thereby eliminating the cost of the rehandling, and keeping the motor truck in constant operation, for it is a known fact to those who keep records of the operation of the trucks that most motor trucks operate about one-half the working hours of the day, whereas with trailers and their work so systematized, motor trucks can operate the maximum number of hours in a working day.

A point that is being impressed upon

the users of motor trucks is the fact that a good trailer will cost from one-third to one-half the price of the truck pulling it, this investment being considered by large trailer users as the largest cost item in connection with the operation of trailers. However, trailer manufacturers figure an increase of 10 per cent in the operating cost of the truck to pull the trailer.

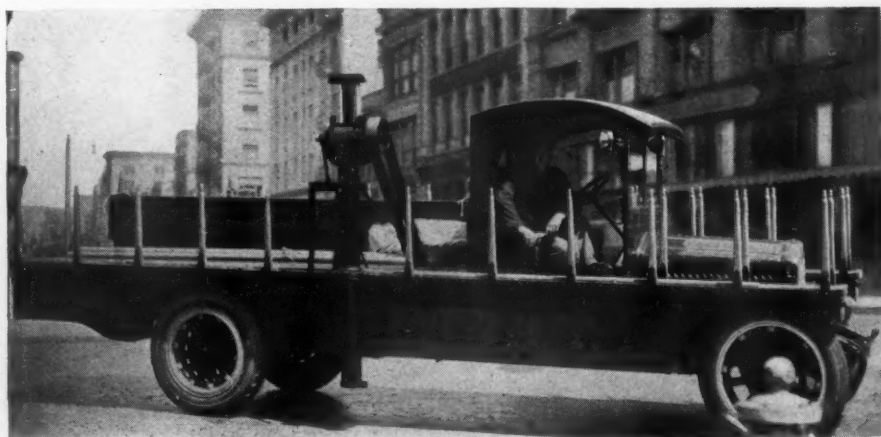
The trailer bears the same relation to the motor truck that a freight car does to a locomotive, or a barge to a freighter. It carries the surplus load which the modern truck has power to pull, but which the present-day chassis cannot carry in addition to its own load.

The truck can develop enough power to move itself and its capacity load up grades of 20 per cent or even more, and through heavy mud, but when operating on heavy surfaces, and on ordinary grades, it can exert sufficient drawbar pull to haul at

least twice its own rated capacity, and in some instances three times its rated capacity.

Numerous improvements have been made in the last few years in the design of trailers, and the improvements that have been made in the last two years is another indication of the thought that is being put to this particular end of the automotive industry.

One of the things that trailers can do in the handling of fruit is to reduce load handling delays by enabling the operator to load or unload one trailer while the truck is hauling another. Many trailer users find it possible by systematic routing and the use of several trailers, in addition to the motor truck, to leave empty trailers at different points on the outgoing trips, and to pick up these same trailers loaded on returning, thus greatly increasing the results obtained from their trucks.



Truck Equipped With a Novel Tent Stake Driver

Showing the device for driving tent stakes, recently installed on a truck by a tent and awning company. The device is driven by a belt from the main engine shaft. By manipulating a clutch the hammer is raised and when it reaches a certain height it is automatically tripped and drops down striking the stake quickly driving it into the ground. Compartments for carrying material are arranged under the bed on both sides of the motor truck. Special provision has also been made for carrying long tent poles.



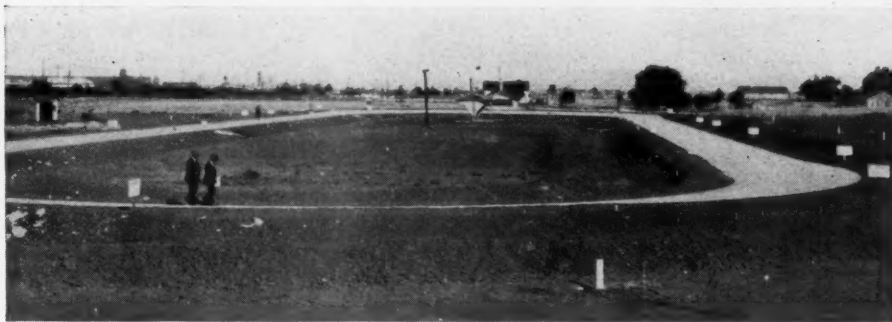
# New Developments in Road Construction Methods Anticipated as Result of California Tests

**Improved Type of Plain and Reinforced Concrete  
Objective. Best Types of Construction Adaptable  
to Various Soil Conditions Also to be Determined**

**A** CONCRETE highway recently built in the form of a race track at Pittsburg, California, for the purpose of a testing to destruction by means of motor traffic in order to determine by observation under the same conditions of traffic wear and on the same sub-grade, the relative merits of different materials and cross-section design and at the same time to develop, if possible, an improved type of plain and reinforced concrete pavement. The test will be started shortly.

Complete checks of results at all stages will be made so that, at the conclusion of the test, the results will be available in practical form and used to advantage in determining what types of construction are best adapted to soil conditions.

In line with the development of an improved type of plain and reinforced



Complete Concrete Test Highway Recently Built at Pittsburg, Cal.

of finding a way of reducing the cost of reinforcing steel. This they did by offering to manufacture—and are doing it—a special grade of steel having a little more



SECTION G  
REINFORCEMENT—69 TONS PER MILE  
Showing Reinforcing Used in  
Section G of Track

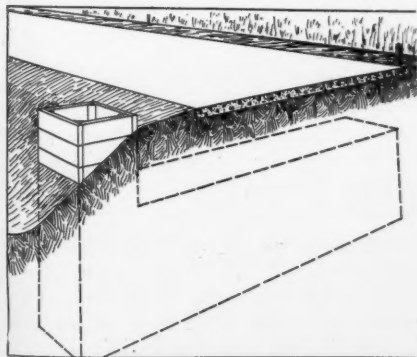
than twice the strength of the grades now available. This steel they provide with an extra bond so as to make the additional strength available and also preserve

the other qualities in steel necessary for work of this character. This step reduces costs beyond expectations and placed reinforced concrete within the range of practical possibility from the economic point of view. It was this steel that was used in several of the thirteen sections.

However, there still continued the lack of information in the other directions and nothing definite could be accomplished in its absence. The Columbia Steel Company again came to the rescue by undertaking the construction of a test highway and destroying it by means of truck traffic.

The conditions of the test are of such a nature that the results, it is believed, will be of utmost value to City, County and State road builders. The participation of eminent engineers will undoubtedly lead to new and important developments and data on concrete pavement construction.

Sections of the road that give away first



Tunnels Have Been Constructed at  
Various Points Under Test Road

concrete pavement, several of the thirteen sections laid were reinforced with a special steel of very high tensile strength which is expected to strengthen the slab more than would be feasible even with an excessive amount of commercial grade steel.

Road building difficulties were presented to the Columbia Steel Company, of Pittsburg, California, last winter, with the idea that they might aid to the extent



Showing Method of Laying Reinforcing

will be repaired so that the whole road will be usable until its last unit fails under the strain. This will afford valuable opportunity to observe results of various types of repair work.

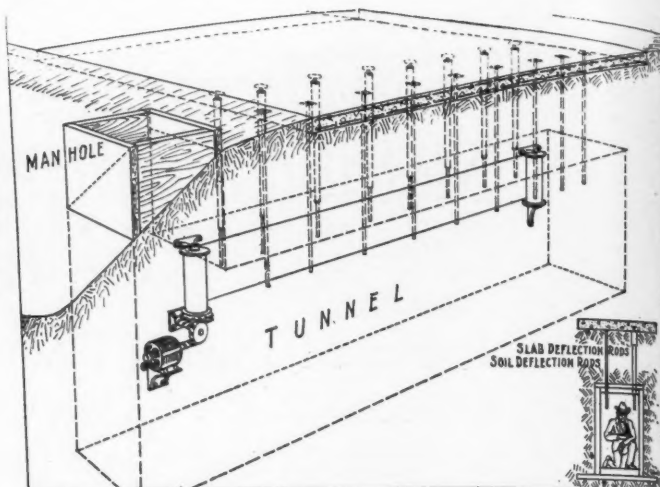
Observations will be made of the results of this traffic and later, when some of the stronger sections fail to yield, War Department equipment will be used to complete the destruction.

Before starting the building of this test highway, questionnaires were sent to the Highway Engineers of the State, asking for their views as to what should be included in the test or any other suggestions they might make. The State and Federal Engineers were also consulted with the same object in view. The hearty co-operation of all was freely given, with the result that the thirteen types were selected as conforming the nearest to all the views given.

Many observations on the test highway will be made that were never attempted before.

This will be possible because of the fact that four observation tunnels were

Another View of Tunnel Showing Methods Employed for Making Records of Flexure of Slabs and Sub-Grade.



built under the pavement, which will enable observations to be taken on the underside of slabs, to find out just what happens to the underside of the slab and sub-grade. By means of these tunnels it will be possible to determine the effect of various truck loads and speeds on the

flexure of the slabs, as well as on the sub-grade.

Self-recording instruments as shown in one of the illustrations will be used in each tunnel, which will indicate directly the flexure caused by the loads on the top of the pavement.

## Reductions Not as Numerous as Last Month

**P**RICE reductions in the motor truck field are not as extensive during the past month as compared with the previous months. One large reduction of 22 per cent is the outstanding feature. It is not likely that there will be many more reductions within the next month.

### Fourth Reduction for Federal

A price reduction averaging 22 per cent, the fourth reduction in the last two years, has been announced by the Federal Motor Truck Co., of Detroit, on all models.

These price changes are as follows: \$700 on 1 to 1½-ton; \$550 on 1½ to 2-ton; \$600 on 2 to 2½-ton; \$800 on 3½ to 4-ton; \$850 on 5 to 6-ton. Reductions of \$600 to \$800 respectively were announced on light and heavy duty tractors.

On commenting on the new prices, M. L. Pulcher, vice-president and general manager of the company, said: "There were no burdensome financial overhead, no bonded or preferred stock indebtedness, no interest or principal charges or bank obligations that we must pass to our customers. Production costs have been cut as low as they can hope to be cut."

### Commerce Sets 1922 Prices

Prices for 1922 have been announced and guaranteed for the ensuing year by the Commerce Motor Car Co., of Detroit, Mich. The new prices have been made public by Walter E. Parker, president of the company, who says they are the lowest in the history of the firm.

### Republic Reductions

Prices of the complete line of Republic trucks have been reduced, effective immediately, according to a statement issued by Colonel Frank E. Smith, first vice-president and general manager of the Republic Truck Sales Corporation.

The reductions range from \$300 to \$750. Here are the new prices: ¾-ton chassis, \$1250; ¾-ton with completely equipped canopy top express body, \$1395; 1-ton chassis, \$1395; 1½ to 2-ton chassis, \$1795; 2½ to 3-ton chassis, \$2195; 3½ to 4-ton chassis, \$3095.

### Change in Merchant Dispatch Price

The list price of the Merchant Dispatch chassis, Model 21, the product of the Atlas Truck Corp., York, Pa., is reduced to \$1185 f.o.b. York, Pa. The old price was listed at \$1550.

The Merchant Dispatch is a 1-ton speed job with a 3½ x 5-in. motor, ball-bearing transmission, Atlas patented worm-drive rear axle, 130-in. wheelbase, cord tires, electrical starting and lighting equipment and a series of bodies for any type of work.

### Newark Manufacturer Reduces

The Day-Elder Motors Corp., Newark, N. J., has made the following announcement: "Effective November 1, we have made rather drastic reductions in the list prices of the Day-Elder motor truck chassis, as follows: Model A, 1 to 1½-ton, \$1600; Model B, 1½ to 2-ton, \$2000; Model D, 2 to 2½-ton, \$2400; Model C, 2½ to 3-ton, \$2750; Model F, 3½ to 4-ton, \$3150, and Model E, 5 to 6-ton, \$4250.

### Reductions of Patriot Models

New prices have been announced on the three models of the Patriot Manufacturing Co., of Lincoln, Neb., on the Patriot Revere, the Patriot Lincoln and the Patriot Washington. The reductions range from 5 to 13 per cent approximately.

### Maccar Announces Prices

In the new price list of the Maccar Truck Co., taking effect immediately, Model L, 1½-ton, is \$2700; Model HA, 2-ton, \$3100; Model H, 3-ton, \$3400; Model M, 4-ton, \$4200; Model G, 5 to 6-ton, \$4950.

### Revision in Koehler List

Revisions have been made in the price list of the H. J. Koehler Corp., Bloomfield, N. J. New prices can be found in the specification table for trucks in this issue.

### Wilcox Trux Reduces

Reductions averaging about 10 per cent have been made public in the prices of Wilcox trucks, the products of the Wilcox Trux, Inc., Minneapolis, Minn. The reductions are made on all models.

### Reductions on Three Tower Models

Three models of the Tower Motor Truck Co., St. Louis, Mo., have been reduced in price. The new prices are: 1½ ton, \$2,900; 2½ ton, \$3,200; 3½ ton, \$4,100.

### Parts Company Reduces

The New Era Spring & Specialty Co., of Grand Rapids, Mich., recently announced new prices and discounts on springs, tire carriers, spring bumpers and visors.

### Other Reductions

Other companies to make reduction announcements are the Douglas Motors Corp., Omaha, Nebr., and the Walter Motor Truck Co., of New York City. The latter company reduces its 5-ton from \$5,600 to \$4,850.





## *The Load You Can't Estimate*

**N**O matter how great is the foresight of the machine designer, he cannot guard against unexpected thrust loads on the bearings caused by conditions beyond his control.

The Deep Groove Bearing can withstand thrust loads greatly in excess of its radial capacity and coming from either direction.

Both the design and quality of this double

purpose bearing are endorsed by the mark **SKF** and are backed by the world-wide researches at the disposal of **SKF** Industries, Inc., plus the years of domestic experience of The Hess-Bright Mfg. Co.

This experience is at your disposal and you are urged to submit your bearing problems to us for free and impartial advice.

### **The Hess-Bright Mfg. Co.**

PHILADELPHIA, PA.

*Supervised at the Request of the Stockholders by*

### **SKF Industries, Inc.**

### Midwest Approved in Fifth Avenue Coach Company's Test

In order to determine the performance of Midwest engines the Fifth Avenue Coach Company of New York City recently put them through a gruelling test covering a period of eighteen months. After the test the Okey for the purchase covering the  $3\frac{5}{8}$  x 5-in. for single deck and the  $4\frac{1}{8}$  x  $5\frac{1}{4}$ -in. engines for double deck buses was rendered.

Test requirements included engine ability to stand the gaff of frequent starts and stops, heavy loads and continuous running. When the first engines were placed for test, the Midwest Engine Company guaranteed the bus builders at the outset an oil consumption reduction of at least 50 per cent—and the Coach Company was interested because the slightest fraction toward economy is highly important. This claim by the engine manufacturer, it is pointed out, is well founded, in that the engine is lubricated in accordance to the work required of it. The important point in the Midwest system of lubrication is that the oil is delivered under pressure with respect to load which eliminates under-lubrication or over-lubrication as conditions of speed and load change. The functioning of the system is entirely automatic. The principle involves the utilization of the vacuum created by the engine, which is taken from the intake manifold.

First the engines were placed on a dynamometer for six months, in an attempt to break them up under load, but showing no ill effects from the treatment they had received, the engines were then subjected to various engineering tests, finally being placed in buses to be tried out under actual working conditions.

These road tests were conducted in buses operating in New York thoroughfares during the regular course of business, and after 27,000 miles, not 150 miles to the gallon of oil as formerly obtained, but 531 miles was obtained for the total mileage of the test. The percentage of this increase of mileage is important and acceptable to a bus company depending upon small margins for profit.

The engines were given a special test covering 500 miles under actual working conditions—installed in buses used in passenger-carrying on New York streets, and were found to give 7.11 miles to the gallon of fuel and 917 miles to the gallon of oil.

### Six Wheeler Establishes New Hauling Record

Significant as to what part the motor truck may be called on to play in the nation's transportation problem, at least in short haul transportation, is the trip just made by the Goodyear six-wheel truck between San Francisco and Los Angeles.

The trip of 420 miles was made in 14 hours and 40 minutes, or at an average speed uphill and down of 29 miles per hour. Five tons of freight were carried, mostly tires, tubes and accessories.

The best previous time for the distance was made by a  $3\frac{1}{2}$ -ton truck, which averaged a speed of 24 miles per hour.

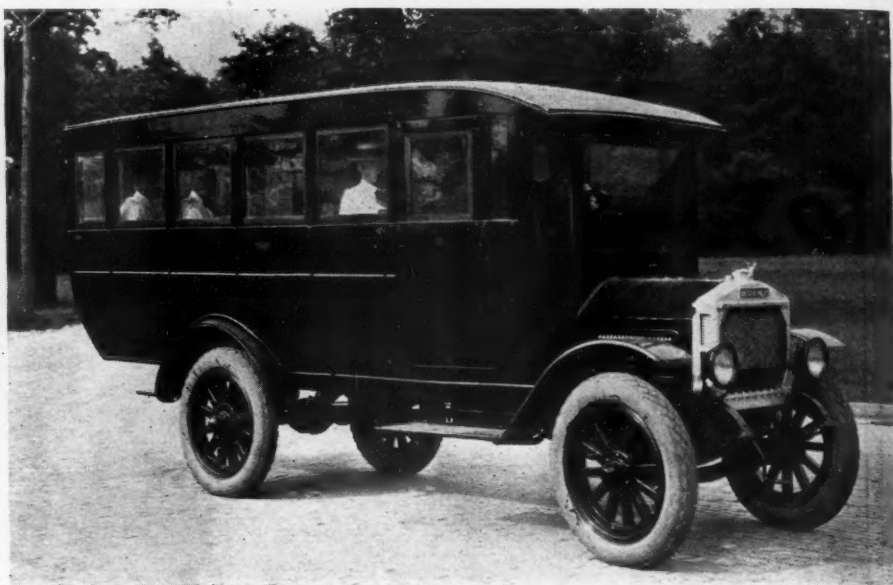
The Southern Pacific railroad, over a slightly longer route, makes this same trip by fast passenger train in 14 hours and 50 minutes. The six wheeler's trip was made over the inside or "ridge" road, via Bakersfield and Fresno, rather than the beach road which is comparatively level. The truck had to climb to a height of 1700 feet in the first 27 miles, dropped to 1200 feet in the next seven, then in the next 40 miles had to make an ascent to 4230 feet above sea level.

Comparatively, freight from New York shipped out of Pittsburgh or Montreal in the morning can be delivered that eve-

ning at its destination by motor truck just an hour or so later than the express passenger trains arrive.

Based on an average speed of 29 miles an hour, the Mississippi River can be brought within two days' journey by motor truck of either the Atlantic or the Pacific seaboard, providing the progressive improvement of national highways is continued.

The six wheeler which is a unique experiment in motor transportation, was designed by Goodyear engineers and has the drive connected with the four rear wheels. It rode on 8-inch tires, giving an economy in first cost and operating expense, since four eight-inch tires can be bought for less than two 10-inch tires.



One-Ton Bessemer Chassis Equipped With a Body With a Capacity for Thirty Children Recently Sold by a Bessemer Distributor. It is Equipped With Electric Starter and Lights. List Price Was \$2295 f. o. b. Factory



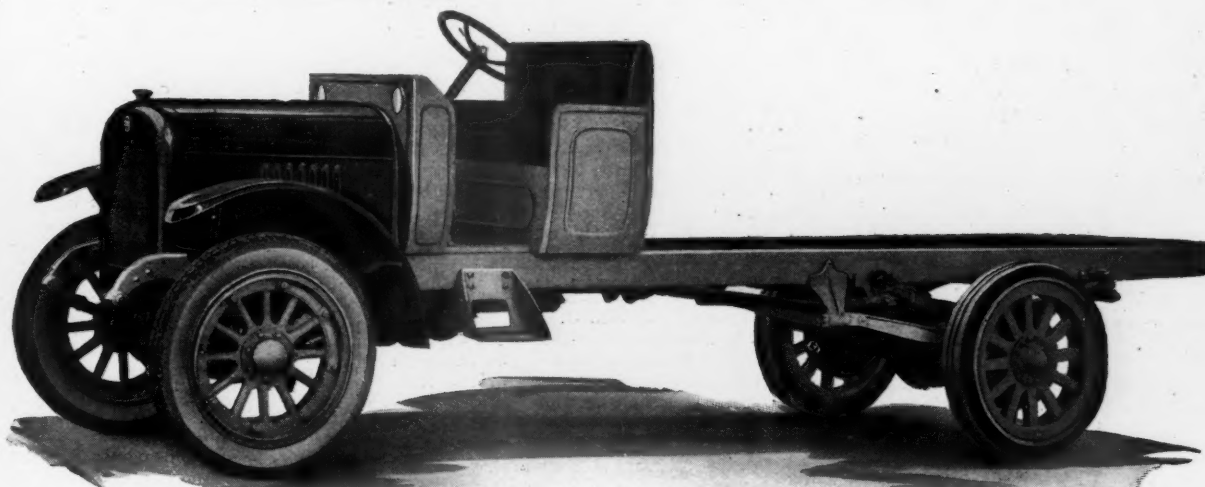
Appropriate Head That Lead Procession at the Dedication of the Dixie Highway in Cincinnati

This special roomy and well equipped steel bus body built and furnished by the United States Motor Truck Company, Cincinnati, Ohio, illustrates the great change that has taken place in transportation, showing in a measure the results coming from the building of these splendid, permanent highways.



# RUGGLES

## Two-Ton Business Truck



The Business World Demands Dependable  
Motor Trucks at Low Prices—  
*RUGGLES meets this demand*

The Ruggles two-tonner is a sturdy, dependable motor truck—built for 4000 pounds pay load with reasonable overload in emergency.

It is designed and built by Frank W. Ruggles, recognized as the World's Greatest Truck Builder. Like the RUGGLES one-ton truck, the two-ton model lists *at a low price*—a price that will assure immediate sales and owner satisfaction.



### *Distributors and Dealers:*

If you believe in the future—believe in motor truck transportation—believe in quick turnover of capital—believe in the Ruggles sound ideas of manufacturing and merchandising—believe in better trucks at right prices—believe in yourself—write us for complete data NOW.

Your territory may be open.

RUGGLES MOTOR TRUCK COMPANY, *Saginaw, Michigan*  
*Canadian Factory: Ruggles Motor Truck Co., Ltd., London, Ont., Canada*

## Personal Items

**C. A. Aldrich**, formerly president of the Aldrich-Stephens Truck Co., St. Louis, Mo., has been appointed city sales manager for the Traffic Motor Truck Corp., to have charge of both retail and wholesale sales.

**F. E. Badger** is the new sales manager of the chassis spring division of Detroit Steel Products Co., manufacturer of Detroit springs. During the war Mr. Badger had charge of the Motor Transport Corps, base repair shops at Camp Holabird, Md.

**C. P. Cushway** has been made manager of the Cable and Specialties department of the Belden Manufacturing Co., 23rd St. and Western Ave., Chicago. His work will cover telephone, automobile and appliance cord assemblies, cordage, flexible cable, and insulating materials.

**John P. Franck**, for the past four years sales manager of the Guide Motor Lamp Mfg. Co., Cleveland, O., has resigned to become sales manager for the Thos. J. Corcoran Lamp Co., of Cincinnati, O.

**J. A. Gelzer**, of Chicago, has severed his connections with the Wagner Electric Manufacturing Co., of St. Louis, Mo., to assume the sales management of the Hoosier Clutch Co., of Muncie, Ind.

**H. H. Griffith**, of St. Louis, Mo., has been appointed distributor for Missouri and Southern Illinois of the Tel-Rite Auto Signal, manufactured by the Tel-Rite Auto Specialties Co., of Cleveland, O.

**William B. Hall**, for the past four years in charge of General Motors Truck Co., advertising and other automotive accounts for the Green, Fulton, Cunningham Co., advertising agency, Detroit, has resigned to join the Dunlap-Ward Advertising Co., of Cleveland, Ohio.

**C. H. Hobbs**, for 14 years with the Lackawanna Steel Co., has been made assistant general manager of sales of the Detroit Seamless Steel Tubes Co., of Detroit, Mich. This is a new office and is part of a plan to increase the sales force.

**Clyde W. Holcker**, for 15 years in the sales department of the Goodyear Tire & Rubber Co., has resigned and is now with the Henshaw Motor Co., of Boston, Mass.

**R. C. Kauffman**, well known in the motor truck industry through a number of successful connections with the selling end of the business, and as organizer and promoter of a number of transportation companies, has accepted the management of the New York branch of O. Armleder Co., Cincinnati, O. His previous experience in the New York territory qualifies him to fill this position. Mr. Kauffman intends to apply intensive salesmanship in his new capacity, taking the road himself if necessary. If successful he will organize a branch in Philadelphia to be controlled from the New York office.

**Joseph P. McCarthy** will handle the southeastern sales territory of the Corcoran Manufacturing Co., Cincinnati, manufacturer of Peerless products for Fords. This territory includes all states east of the Mississippi from Kentucky and Virginia south to Florida.

**W. T. McHatton**, formerly of the Republic Motor Truck Co., of Alma, Mich., has taken the post of southwestern district representative of the Ruggles Motor Truck Co., Saginaw, Mich., with headquarters in Denver.

**W. H. Minchin** has been placed at the head of the newly created sales and advertising department of the Non-Explosive Appliance Co., manufacturer of the Nesom Hot Spot Vaporizer for Fords.

**Robert I. Miner** has been appointed sales engineer of the Pressed Steel Division of the Motor Wheel Corp., Lansing, Mich.

**Allen M. Macool** has been appointed sales manager of the Flexo Company of America, manufacturer of Flexo, an attachment for Ford Worm Drive trucks.

**Ralph D. Mock**, vice-president and former comptroller of the Hydraulic Steel Co., Cleveland, O., has become vice-president, associated with sales.

**William H. Moore** has recently been appointed manager of the Boston branch of the Garford Motor Truck Co., of Lima, O.

**F. A. Morrison** has been announced as assistant secretary of the Maxwell Motor Corp., and the Chalmers Motor Corp. He has been connected with these organizations for several years and his appointment comes to him in recognition of his splendid work during that time.

**Walter E. Myers**, of Cleveland, O., president of the Denman-Myers Cord Tire Co., has returned to this country after two months in Europe, where he has been making a survey of the rubber industry. He is very optimistic about future of industry.

**W. J. Platka**, formerly in charge of the New York sales office of the Wichita Motors Co., Wichita Falls, Tex., has succeeded A. G. Savelli as export manager of that company.

**S. W. Reese**, formerly representative of the Oldfield Tire Co., in the Kansas City district, will succeed H. T. Roseland as branch manager in this district for the Star Rubber Co., Inc., Akron, O.

**W. H. Richardson**, manager of the Chicago branch of the Bearings Service Co., has been transferred to the management of the New York branch. Frank J. Lemper will take Mr. Richardson's place as head of the Chicago branch.

**Carlton B. Stetson** is now acting in the capacity of manager of the Advertising Dept. of the Moto Meter Company, Inc., Long Island City. This position was formerly occupied by O. R. Smith.

**Milton R. Standish**, formerly advertising director of the San Bernardino Daily Sun and Evening Telegram, has been appointed vice-president in charge of promotion of the Gill Storage Battery Co., San Bernardino, Calif.

**E. B. Vantee** will represent the Collier Motor Truck Co., of Bellevue, O., as zone sales manager for Southwestern Missouri and Southeastern Kansas, with headquarters at Joplin, Mo. J. E. Downey will have charge of Oklahoma, with headquarters at Tulsa.

**C. B. Warner** has been made general representative for the Pacific Coast by the Indiana Motor Truck Corp., of Marion, Ind. He will make his headquarters with the Indiana-Pacific Motor Truck Corp., in San Francisco.

**Dever Waters** has joined the Schwartz Wheel Co., of Philadelphia, Pa., in the capacity of sales manager. The Schwartz Co. is now formulating comprehensive plans for expansion.

**O. W. Williams**, for the last four years in charge of material and costs with the United States Motor Truck Co., Cincinnati, O., has been raised to the position of purchasing agent of that company.

**Luther M. Wright**, of Norwalk, has been announced as state distributor for Connecticut for the Bridgeport Motor Truck Corp., of Bridgeport, Conn. Mr. Wright has had many years' experience in the automotive field.

## Removals and Trade Changes

The Anderson Piston Co., of Bowling Green, O., has leased an unused plant of the Vim Motor Manufacturing Co., and will begin getting it ready for occupancy. The Bowling Green plant is to be abandoned.

The Buda Company, Eastern Manager's office, which for the past two years has been maintained at 33 West 42nd St., New York City, has been moved to Room 716, 30 Church St., same city.

The Lakewood Engineering Co., of Cleveland, has moved its Philadelphia office from the Widener Building to the Franklin Trust Building.

The Stewart Warner Speedometer Service Station has leased a tract of land at 1353-1369 South Figueroa St., Los Angeles, Calif., to be used as its new home. The lease is the outgrowth of the rapid expansion of the Stewart Products Service Station, 321 West Pico St., started three years ago.

The Columbia Automotive Supply Co. is the new name for the Columbia Tire & Supply Co., LaFayette, Ind. The firm recently moved to larger and more complete quarters at 218 North 5th St. These changes involve no alteration in the personnel of stockholders or management.

## New Agencies

The Cincinnati Hy-Speed Machine Co., of Cincinnati, has made an exclusive selling arrangement with the Niles-Bement-Pond Co., covering the full line of Hy-Speed products.

The Ferrier Automotive Equipment Co. has been organized in St. Louis with William L. Ferrier as president, to engage in the sale of automobile accessories of all kinds.

The Dayton Airless Tire Co., of Dayton, O., has appointed the Tri-State Tire Co., Memphis, Tenn., as distributor for the Dayton Airless tire in Western Tennessee, Northern Mississippi and Eastern Arkansas.

The Service Motor Truck Co., Wabash, Ind., has announced the appointment of the Pennsylvania Motor Sales Corp., of Pittsburgh, Pa., as distributors of Service trucks in the Western Pennsylvania territory.

The White Company has opened a factory branch in Salt Lake City, Utah, at 763 South State St. J. L. Sydnor, from the Cleveland office, is manager. The new branch is under the western district, operating from the Denver office.

The Hayes Wheel Co., of Jackson, Mich., has established at 250 West 54th St., New York City, a branch of its service and sales for the purpose of supplying the Eastern territory and Export division with the complete line of Hayes products. Donald Ganiard, of the General Offices, will take charge, with L. J. Curry as sales manager and F. R. Symonds in charge of stock, shipping and receiving.

## Literature

The Gill Manufacturing Co., of Chicago, Ill., has issued a comprehensive directory of piston ring sizes which it is now distributing. The publisher states that the purpose of this book is to simplify the sale of piston rings by means of a single compact volume containing the piston ring size data of the entire automotive industry.

Automotive Repair is an instruction manual of repair jobs for the general repair man and the owner, by J. C. Wright, formerly education director of the Roahe Auto and Tractor School, Kansas City, Mo., and now chief of the Industrial Educational Service, Federal Board for Vocational Education, Washington, D. C. The book is well adapted for automobile repair classes. There is a particularly helpful chapter on "Trouble Shooting" and several chapters on electrical equipment. The book can be bought from John Wiley & Sons, Inc., 432 Fourth Ave., New York City.



# THE COMMERCIAL CAR JOURNAL

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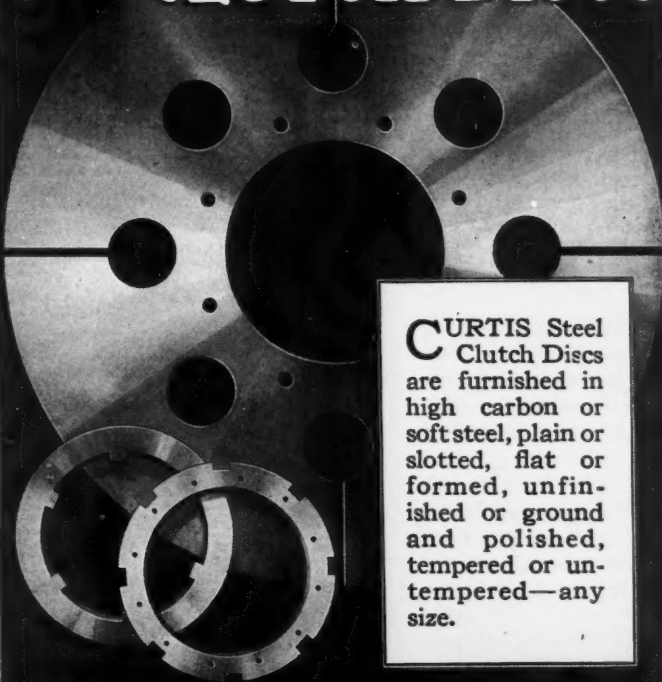
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Circulations, the Recognized Authority on Circulation Audits

# CURTIS CLUTCH DISCS



**CURTIS Steel**  
Clutch Discs  
are furnished in  
high carbon or  
soft steel, plain or  
slotted, flat or  
formed, unfin-  
ished or ground  
and polished,  
tempered or un-  
tempered—any  
size.

**W**E are experts in the manufac-  
ture of custom-built clutch  
discs of precision. We know  
exactly what is necessary to satisfac-  
tory performance in automobile,  
truck or tractor service.

By concentrated effort and intensive  
skill we have over a period of years  
developed the clutch disc business  
to a plane not approached by any  
other manufacturer.

We have solved many perplexing  
problems. We are in a position to  
give expert advice as to your par-  
ticular needs.

**Curtis Clutch Disc Co.**

1507 Kienlen Ave. St. Louis, Mo.





## Direct Dealers' Sales Agreement Selden Truck Corporation Rochester, N.Y.



**This Agreement** made this..... day of ..... 19  
between the SELDEN TRUCK CORPORATION, of ROCHESTER, N. Y., a corporation organized and existing under the laws of the

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### “After Delivery—What?”

The success of the Selden Truck Corporation is founded on two important factors:

- (1) SELDEN “In-built Quality” Motor Trucks
- (2) The SELDEN Dealer Policy

We realized in the very beginning that it was not only essential that we build motor trucks that would establish prestige for the name SELDEN, but that we must establish and maintain a sales policy that would enable SELDEN dealers to build permanent, reputable, prosperous businesses for themselves.

The quality of SELDEN TRUCKS and the SELDEN Dealer Policy are now matters of record. SELDEN achievement stands as a monument.

The booklet, “AFTER DELIVERY—WHAT?”, will tell you how some SELDEN dealers succeeded in building profitable sales organizations. It will acquaint you with the type of dealer the SELDEN CORPORATION takes pleasure in adding to its sales organization when territory is open. **WRITE for your copy.**

*1½, 2½, 3½, 5 Ton Models—All WORM Drive*



**SELDEN TRUCK CORPORATION**  
Rochester, N. Y., U. S. A.

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SELDEN

Accepted at ROCHESTER, N. Y.,

this ..... day of ..... 19....

SELDEN TRUCK CORPORATION

By .....  
Sales Director

By .....

(Dealer) ...

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One of

les Mgr.

# Selden Motor Trucks

